SOUTHWESTERN JOURNAL OF ANTHROPOLOGY

Published by the University of New Mexico and the Laboratory of Anthropology, Santa Fé, in the interest of general anthropology

VOLUME 9 • NUMBER 4 • WINTER • 1953

The Archaeological Sequence of Central India — H. D. Sankalia, B. Subbarao, and S. B. Deo — 343

Alleged Kiowa-Crow Affinities — Robert H. Lowie — 357

A Pattern of Diffusion-Acculturation — Gordon R. Willey — 369

Authoritative Control and the Society System in Jemez Pueblo — Florence Hawley Ellis — 385

Northeast Asian and Alaskan Pottery Relationships — Wendell Oswalt — 395

Physical Anthropology and its Instruments: an Historical Study — Lucile E. Hoyme — 408

The Sins of the Fathers: Concept of Disease among the Canadian Dakota — Ruth Sawtell Wallis and Wilson D. Wallis — 431

Vessel-lip Decoration as a Possible Guide to Southwestern Group Movements and Contacts — Bruce T. Ellis — 436

Index — 459

UNIVERSITY OF NEW MEXICO PRESS
ALBUQUERQUE

THE SOUTHWESTERN JOURNAL OF ANTHROPOLOGY is designed to include articles in all branches of anthropology relating to peoples and cultures, past and present, in any region. It is offered as a vehicle of expression for anthropologists in all parts of the world.

Manuscripts and other editorial materials should be addressed to the Editor, LESLIE SPIER, University of New Mexico, Albuquerque, New Mexico.

Subscription: $4.00 a calendar year (single number, $1.00). Foreign subscription, 1 £ sterling or its equivalent in local currency. Subscriptions should be sent to W. W. HILL, University of New Mexico, Albuquerque, New Mexico. (Remittance should be made payable to the SOUTHWESTERN JOURNAL OF ANTHROPOLOGY.)

Issued in quarterly numbers: Spring, Summer, Autumn, Winter of each year.

Microfilm copies of whole volumes of the SOUTHWESTERN JOURNAL OF ANTHROPOLOGY may be purchased for permanent files by libraries and other subscribers from UNIVERSITY MICROFILMS, 313 N. First Street, Ann Arbor, Michigan, to whom inquiries should be addressed.

Printed at the University of New Mexico Printing Plant.

Entered as second-class matter June 17, 1947, at Albuquerque, New Mexico, under Act of Congress of July 16, 1894.

SOUTHWESTERN JOURNAL
OF ANTHROPOLOGY

VOLUME 9 • NUMBER 4 • WINTER • 1953

THE ARCHAEOLOGICAL SEQUENCE OF CENTRAL INDIA

H. D. SANKALIA, B. SUBBARAO,
AND S. B. DEO

PROBLEMS IN INDIAN ARCHAEOLOGY

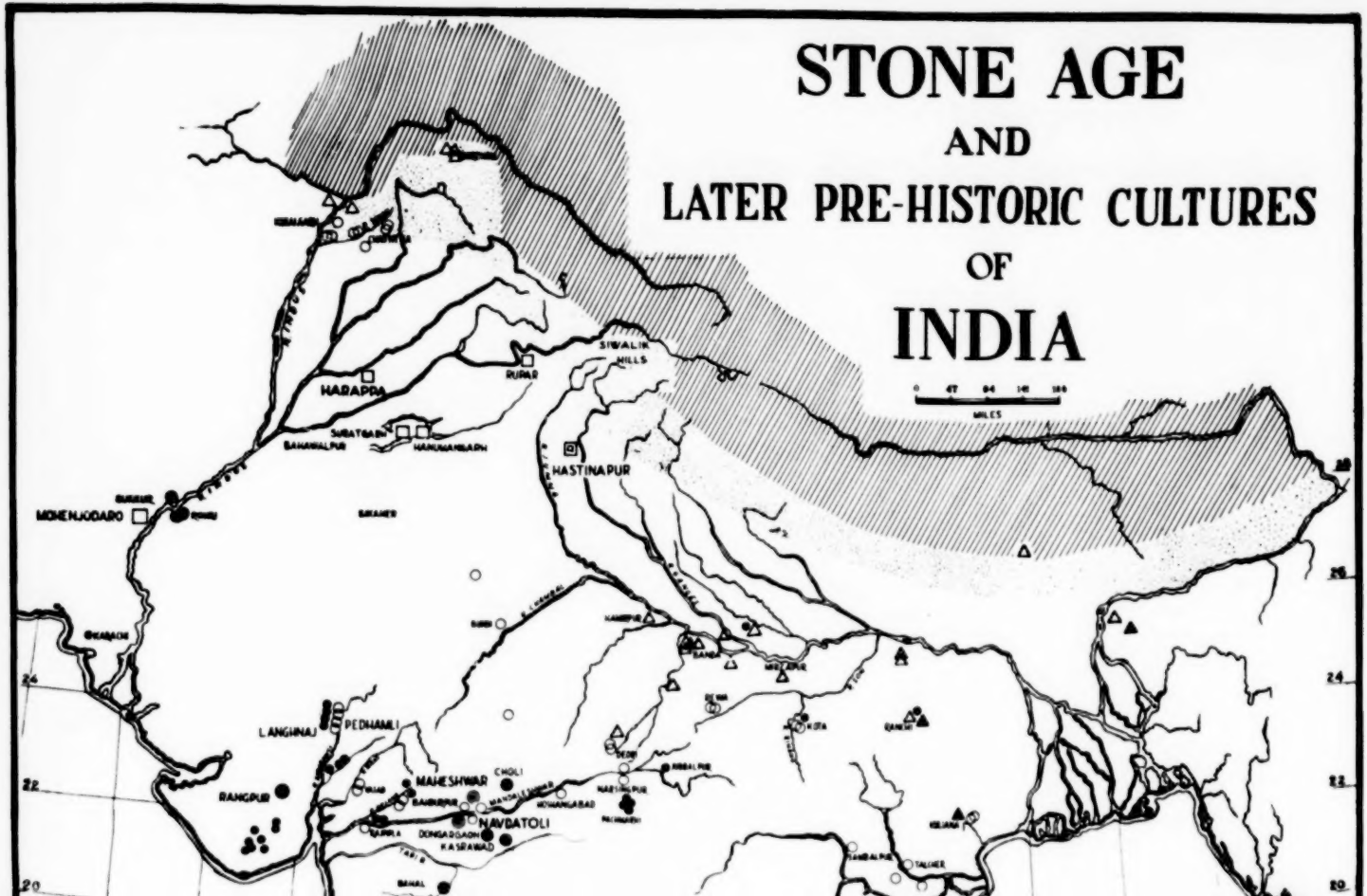
THOUGH SOME ATTEMPTS have been made in India to trace human origins and man's subsequent development to civilization, still, compared to the size of the country, these are negligible. Vast areas remain unexplored. Consequently the few discoveries of the Palaeolithic, Mesolithic, Neolithic, Chalcolithic, and Bronze Age cultures in different parts of India remain unconnected (see map, Fig. 1). Nothing positive can be said therefore about the age and the authors of these cultures, until their relation *inter se* and with similar cultures in the neighboring countries is settled.

This general problem has been made more acute since the partition of India. For all the known sites of the Harappan civilization, as well as the well-stratified Palaeolithic sites discovered by De Terra and Paterson[1] are now in Western Pakistan. Dr (now Sir) Mortimer Wheeler[2] had, therefore, suggested to us to turn our attention to the heart of India, viz. the Gangetic valley.

Any attempt in this direction should also take into consideration Indian tradition. This is recorded in what is known as Purāṇas and Vedic literature. While parts of the latter, e.g. the Rigveda, are of considerable age, the former are semi-historical accounts in Sanskrit, finally redacted and reduced to writing about the fourth century AD. But they also incorporate the earlier tradition from the later Vedic literature. Both these forms of literature, but particularly the Puranas, refer to several dynasties with long genealogies. There are eighteen such Puranas:

1 H. de Terra and T. T. Paterson, *Studies on the Ice Age in India and Associated Human Cultures* (Publication, Carnegie Institution of Washington, no. 493, 1939).

2 R. E. M. Wheeler, *Ancient India* (no. 4, 1947-48), p. 2.


STONE AGE
AND
LATER PRE-HISTORIC CULTURES
OF
INDIA
0 47 94 141 188
MILES
HARAPPA
RUPAR
SIWALIK HILLS
SUKTAGAN DOR
BAHAWALPUR
HARAPPA
HASTINAPUR
MOHENJODARO
SINDH
BIKANER
KHAIRPUR
LANGHNAJ
PEDHAMLI
MAHESHWAR
CHOLI
RANGPUR
NAVDATOLI
DANGESHWAR
RAJGIRHAD
BARUL
KALIBANGAN
TALUKER
24
22
20
26

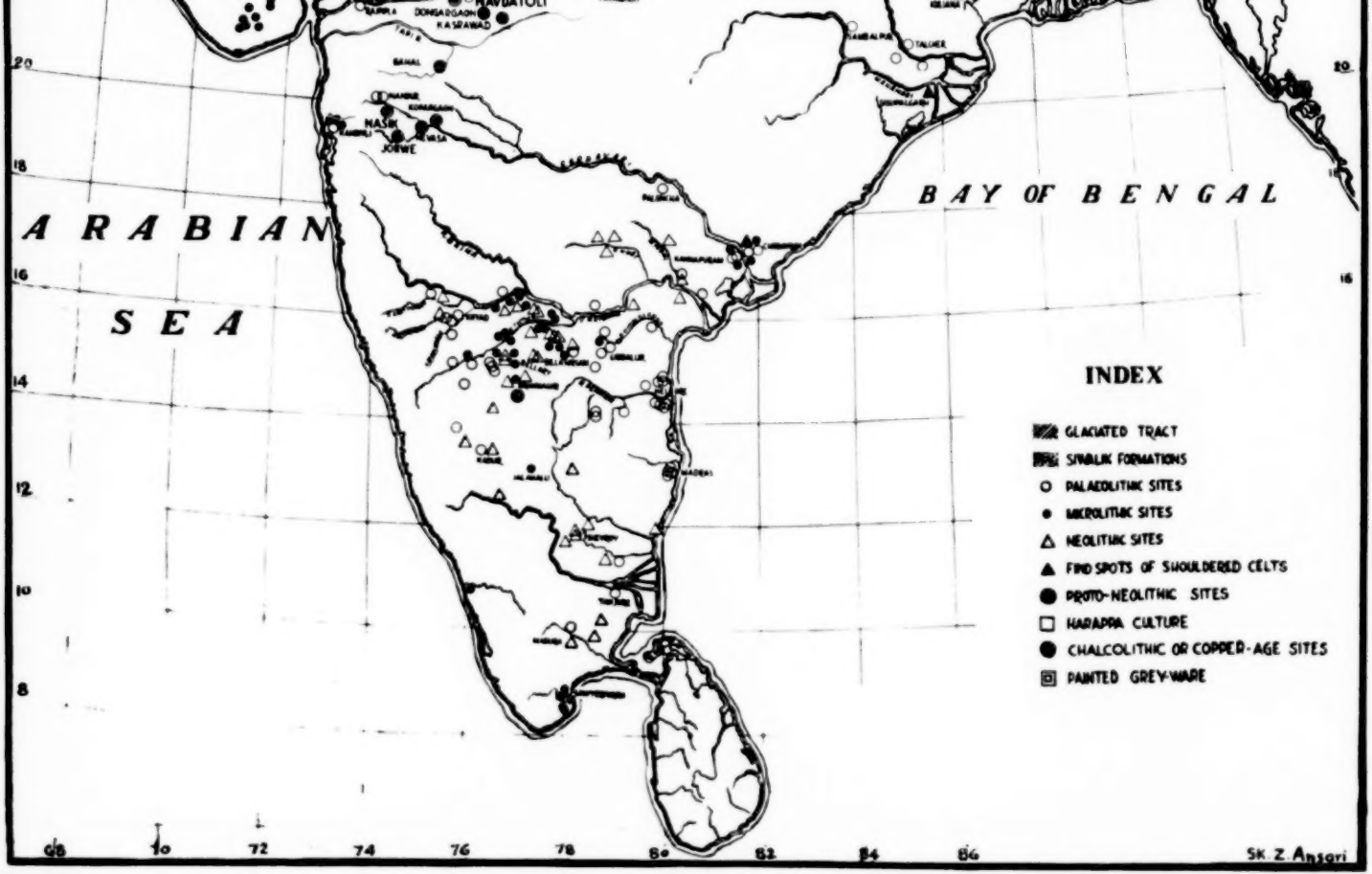


Fig. 1 Map of India showing sites of stone age and later prehistoric cultures.

their accounts have been critically collated by Pargiter.[3] The Puranic record is to some extent comparable with that of Manetho about Egypt and Berossos about Mesopotamia.

According to Pargiter's cautious estimate, some of the earliest Puranic kings ruled about 2000 BC; while the participants in the famous Mahābhārata war, Krishna, the Pāṇḍava heroes, and the Kauravas lived and fought about 1000 BC.

So far, however, this persistent and living Puranic tradition remains unsupported by any archaeological evidence. This is, therefore, the second most important problem in Indian archaeology, namely, to prove the truth or otherwise of Puranic tradition. And if true, to determine its relation in time and space with the various stone and metal age cultures.

The third problem is to link up both or either of these with the so-called historical period in Indian history. This is reckoned to commence about 320 BC, when Chandragupta Maurya ruled at Pāṭaliputra, (modern Patna in Bihar), a few years after the retreat of Alexander the Great from the Punjab. It is a lamentable fact, though true, that in India today we have no dated monuments for a long period of time between 1800 BC and 250 BC.

Things, however, are gradually improving. In 1947, Wheeler found traces of a Chalcolithic culture at Brahmagiri in Mysore.[4] Three years later the Deccan College Research Institute discovered traces of a more extensive Copper Age culture at Nasik and Jorwe,[5] and the Department of Archaeology, Government of India, got evidence of a painted grey ware culture preceding the hitherto known historical cultures of the Gangetic valley at Hastinapur and elsewhere.[6] The following year, however, it succeeded in finding a light ochre-washed pottery culture below the painted grey ware culture. The former seems to be very significant on account of its association with copper implements, which have been found in great hoards all over the Gangetic valley.[7] The Department, since 1950, discovered several sites of Harappa culture (Indus valley civilization) in Bikaner in Rajaputana.[8] Thus the bounds of Indian archaeology are steadily being pushed backward.

---

3 F. E. Pargiter, *Ancient Indian Historical Tradition* (London, 1922).

4 R. E. M. Wheeler, "Brahmagiri and Chandravalli 1947" (in *Ancient India*, 1947-48, p. 181 f.).

5 H. D. Sankalia, *Ancient and Prehistoric Maharashtra* (Journal, Bombay Branch, Royal Asiatic Society, vol. 27, pp. 99-106, 1951).

6 B. B. Lal, article in Illustrated London News, October 4, 1952.

7 Stuart Piggott, *Prehistoric Copper Hoards in the Ganges Basin* (Antiquity, vol. 18, 1944), p. 173.

8 A. Ghosh, article in Bulletin, National Institute of Sciences, no. 1, 1952.

Central India was still, however, a *terra incognita,* though the early work of General Cunningham and others had shown that the region was exceedingly rich in ancient monuments and coins, while De Terra and Paterson[9] had put its Early Stone Age on a firm foundation. Could this gulf between history and prehistory be bridged? This was the main problem before us.

EXCAVATIONS AT NAVDA TOLI AND MAHESHWAR IN MADHYA-BHARAT (CENTRAL INDIA)

A solution of it, as well as the associated problem of the authenticity of the Puranic tradition, was attempted this season (December 1952-March 1953) by a Joint Universities Expedition organized by the Deccan College Research Institute, Poona. The Universities of Poona, Baroda, and Bombay gave financial support, while the Maharaja Sayajirao University of Baroda and the Department of Archaeology, Madhya Bharat, fully coöperated in its execution.

Its main scene of operation was Maheshwar (22° 11′ N and 75° 56′ E). This is a small town on the north (right) bank of the Narmadā in Nimāḍ District of the recently constituted State of Madhya (Central) Bhārat (India). Exactly opposite Maheshwar on the left bank is the tiny village of ferrymen, called Nāvḍā Ṭoli. There were several reasons for selecting these places. Maheshwar has high mounds, some over one hundred feet in height. These are strewn with huge amounts of debris of potsherds of several periods, brick structures, and small bastion-like circular ring-wells. A careful survey yields old copper coins, semi-precious beads and other smaller finds. Local, as well as Puranic tradition, associates this site with the ancient Māhishmatī, a city supposed to be founded by King Muchukunda and others, who, even according to Pargiter's conservative estimate, would have lived at least in 1800 BC. Early historic (ca. 300 BC) Buddhist and Jain literature refers to a Mahissati city on the ancient caravan route between Vaiśāli and Paithan. The existence of a Buddhist stupa on the south bank of the Narbada opposite Maheshwar, and another group three miles southeast (Kasravad) confirms this. For Buddhist settlements always were located near important cities but along the old highways leading to and out of them and away from the main habitation. Whatever be the truth, the geographic position of present Maheshwar is indeed important. It lies respectively on or near the old and the new highways from the south to the north. Its value, therefore, as a center of exchange of ideas and commodities from the northern and southern cultural areas can be imagined.

9 De Terra and Paterson, *op. cit.*

What, however, we lacked at Maheshwar were definite and abundant clues about its proto-historic cultural phases. While a few traces in the form of painted pottery and microliths had been previously discovered on a western mound at Maheshwar, other mounds had not yielded anything distinctively proto-historic. This deficiency was filled by Navda Toli. Here the mounds, though comparatively low, were covered, it appeared during the surface survey, by nothing else but microliths and painted pottery. Early historic and later period sherds were only occasional.

What we, therefore, sought was to connect the cultural periods at Maheshwar and Navda Toli and see if these would form an unbroken sequence.

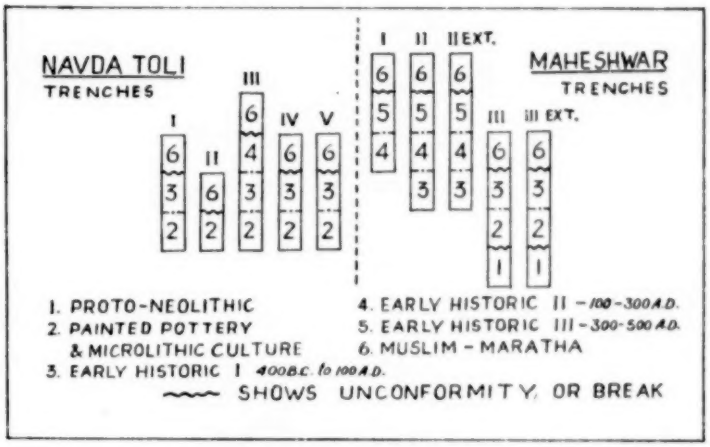
Navda Toli is a small site. Here about three furlongs to the south of the present river bed, there are four mounds (called here Mounds I-IV). These cover an area of roughly half a square mile. Mound III is roundish but the rest are of an irregular shape. Here the virgin soil was exposed at varying depths. The maximum number of layers were on the northern side of Trench III on Mound II and Trench V on Mound III which had to be dug to a depth of about twenty feet.

Maheshwar is a small town. But it appears certain that the ancient habitation stretched for over a mile from the east, where the river Māheshwarī meets the Narmada, to the west where now stands a Ganesha temple on a mound, overlooking the river and a nalā (gulley). Its transverse extension was small, not more than half a mile. For the river Maheshwari coming from the north almost encircles the town by first turning sharply eastward and then southward to join the Narmada. The occupation started from the cliffs overlooking the river and spread over an arc in the bend of the river Narbada. The modern town, the mediaeval temples, and the fort are built over the debris of ancient habitations. So an undisturbed site for digging is difficult to find. Three mounds representing the eastern, central, and western end of the habitation were, therefore, selected for digging.

While our excavations on either side of the Narmada brought out the succession of man-made debris, a careful and intensive survey of the river cliffs from Mandaleshwar in the east up to Sahasradhārā in the west, as well as the nalas (gullies) abutting on the river, in an area of about one hundred square miles, showed how various deposits had been accumulated by nature below the artificial ones. Though we were not lucky in discovering any human or animal fossils in the Narmada gravels or clay, we found that the river valley had exposed the same succession of deposits marking cycles of aggradation with breaks, beginning with the Mid-Pleistocene, as observed by De Terra at Hoshangabad and elsewhere

farther east. These natural as well as artificial layers and the associated presence or absence of human cultures at Maheshwar and Navda Toli can best be illustrated by the chart below.

In this sequence of cultures, the Palaeolithic stage was already attested by De Terra's finds. Our work only showed that this part of the Narmada valley was also occupied by Palaeolithic man. And a statistical analysis of all the collected tools indicates that he preferred large and small flakes to cores, and scrap-



Sequence of cultures in the Maheshwar area.

ers, choppers, and cleavers to hand-axes. Generally the tools are of various shades of fine-grained quartzite but a similar quality of jasper and trap was also used. The technique is Clactonian and Abbevillo-Acheulean. The last seems to be the marked characteristic of the tools—cleavers and hand-axes—from the upper gravel.

No artifacts were found in the light-brown sandy silt which caps the gravels. Hence it may be presumed that man was absent during this aggradation phase. However, at three or four localities fine flakes of jasper and a discoid core flaked all over were found *in situ* in the fine gravel which lies immediately below the upper silty layers. Technologically these may be regarded as the forerunners of

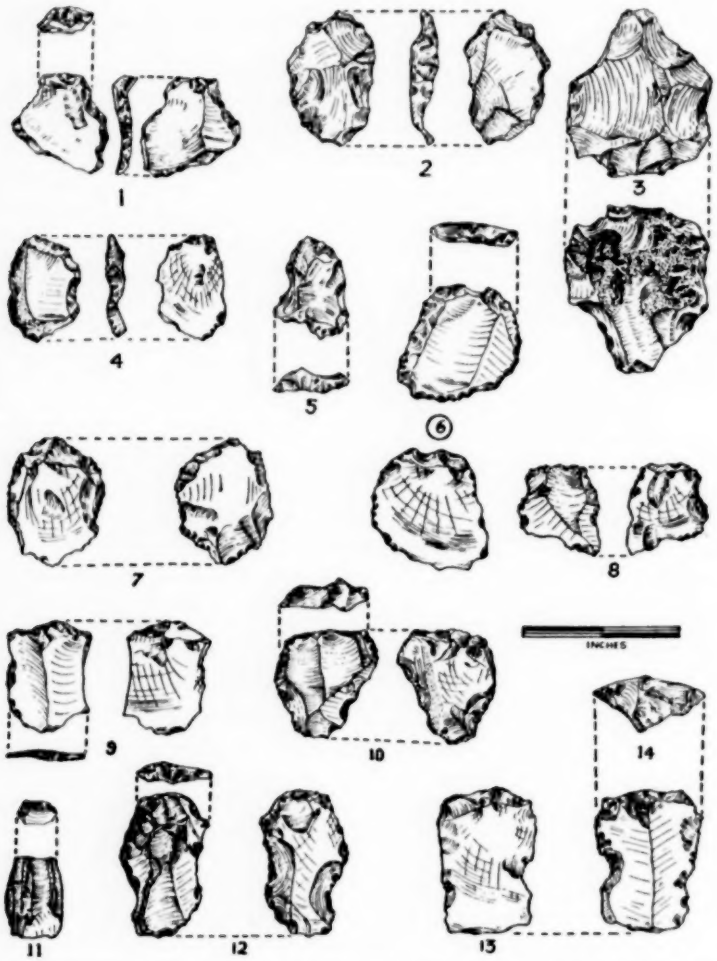


FIG. 2 Proto-microliths (or neoliths) from Maheshwar area: cores and various types of scrapers.

the industry which is found in large quantity in the black soil, or the last phase of the Palaeolithic. There is not enough evidence to call it Upper Palaeolithic. This occurrence of small tools has also been recorded by De Terra. He accounts for it as a re-deposition.

The next distinct cultural phase is found associated with the black soil layer. It may be here mentioned that at some places this soil is dark-brown, and towards the trap hills the soil is gravelly and lateritic. The hills as well as the plains yield a large number of stone artifacts. These consist primarily of several kinds of small and medium-sized scrapers, irregular and at times fluted cores, and discoids (Fig. 2). These were made from veins of jasper, chert, etc. in the trap. Huge cores of variegated jasper, about three by two feet or even larger, were observed by us at Choli. A number of tools were picked up similarly around exposed veins of jasper, suggesting "factory sites."

De Terra called this industry Proto-Neolithic. We were first inclined to call it Proto-Microlithic, since occasionally it contains fluted cores, which is the characteristic feature of the succeeding cultural phase. Typologically and technologically this industry leads to the advanced microlithic industry of the succeeding phase. However, it also resembles the flint industry of Rohri, and since stone mace-heads with typical hour-glass section stratigraphically overlie it, De Terra's description of it as Proto-Neolithic may not be wrong. Our fuller study might later bring out its exact place in the evolution of Stone Age cultures of Central India.

The succeeding layers introduce us to a hitherto unknown cultural phase in Central India. Stratigraphically its position is definitely below the historical in which ancient coins, Buddhist stupa, a well-known pottery, and other smaller objects figure. Its debris, from five to eight feet in thickness, lie over the black soil. So far no unmistakable traces of well-defined structures of this phase have been observed by us. From the nature of certain earth layers the existence of mud-walled houses may be presumed. However, the use of a brick-like object was known. Besides finding several fragments of a round object having coarse burnt brick-like fabric, the flooring of Trench I, Mound I at Navda Toli was found to have a surface of similar nature, though no shape was visible. Whatever this be, the distinctive features of this culture are a well-refined or advanced microlithic industry and painted and unpainted pottery. The former is characterized by a few distinctive types of tools (Fig. 3) fashioned of flakes and cores of milky chalcedony, agate, and occasionally green and red jasper and chert. The makers of these took nodules and removed long parallel sided flakes after facetting the platform. With these flakes they made various tools: blade (by blunting one side

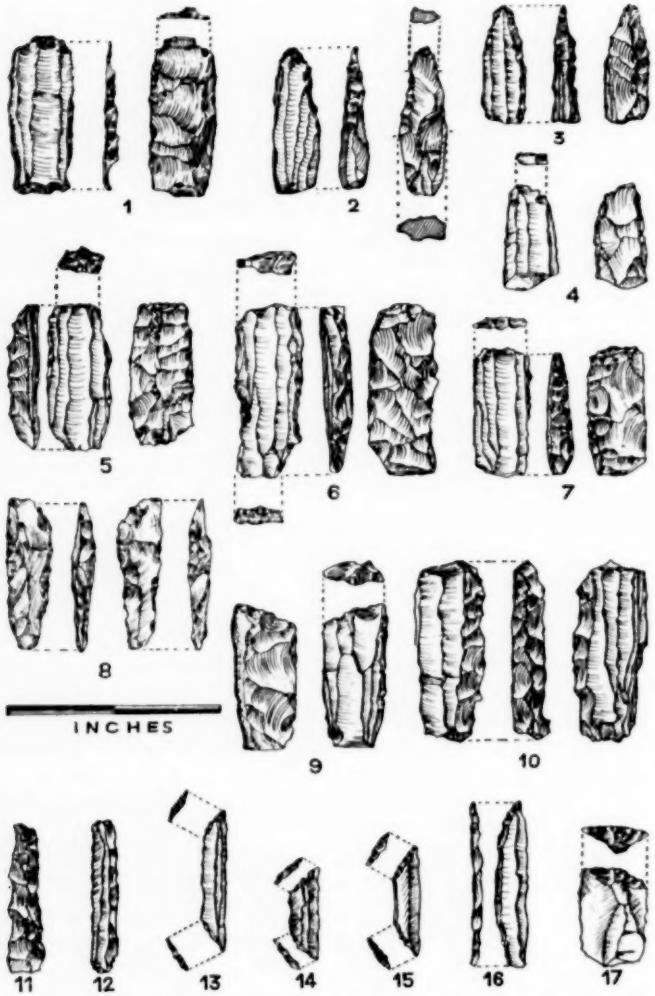


FIG. 3 Types of microliths from Navda Toli: *1-7*, pointed, fluted, and cross-flaked cores; *8-17*, blades, triangles, and end-scraper.

with steep retouch), lunate (by blunting it along the arc), triangle and trapeze (by making them into these geometric patterns with steep retouch) and penknife-blades (by obliquely retouching the end of a long flake, giving rise to a point). When parallel-sided flakes are removed from the nodule, the original core appears fluted, with long parallel ridges. The most distinctive feature of this advanced microlithic industry is the deliberate use of these cores. The latter are flattened on one side by removing shallow flakes, and made thin. The thickness varies from three-quarters to one-eighth inch. After flattening, the cores are made into pointed tools like borers or arrow heads and scrapers. An end-scraper is formed by retouching the thin end of a core. Similarly, a side-scraper is formed by alternate step flaking on the back and side of a core.

Statistical analysis of *all* the potsherds collected from Mounds I and III at Navda Toli shows that the pottery—both painted and unpainted—was predominantly red. Of course, the red occurs in a variety of shades—orange and bright red, deep and light chocolate and tan, pink, and snuff-like—as different types of slips are used. Further, the red persists to the last, whereas the black gradually dies out. The percentage of painted pottery, though very low in comparison to the total (about ten percent) shows a definite increase, almost double, in lower layers.

Among the painted sherds, the black-on-red forms 89.74 percent of all the painted sherds, while other shades of red were also used much restrictedly. Special mention should be made of two varieties, in one of which the painting occurs on a cream slip, and in the other ashy white lines on burnished black and tan surfaces. The number of such sherds are on the increase in lower layers. In the former variety the painting is in deep black over a thick cream slip or coating on an ashy black surface. The core is porous, and the ware not well-baked, hence brittle. In spite of the fabric being poor, the paintings are well preserved. The latter variety, however, is well burnt, has a burnished black surface near the neck and reddish-tan near the base of the pot. The painting, consisting usually of oblique lines in ashy white on the black neck, is very faint on almost all the sherds recovered.

The designs on the painted pottery include a variety of geometric, naturalistic, and stylized human and animal motifs (Fig. 5). There are hatched triangles, solid diamonds, parallel lines, circles, semicircles, leaves, and creepers, and perhaps the rising sun, dancing human figures, and the running antelope.

No complete vessels were found. The sherds, however, indicate the existence of various types and sizes of bowls, dishes, globular vessels, and huge storage jars. Special mention must be made of bowls and dishes with stands (Fig. 5, a) and vessels having channel or cut spouts. The latter are painted on either inside

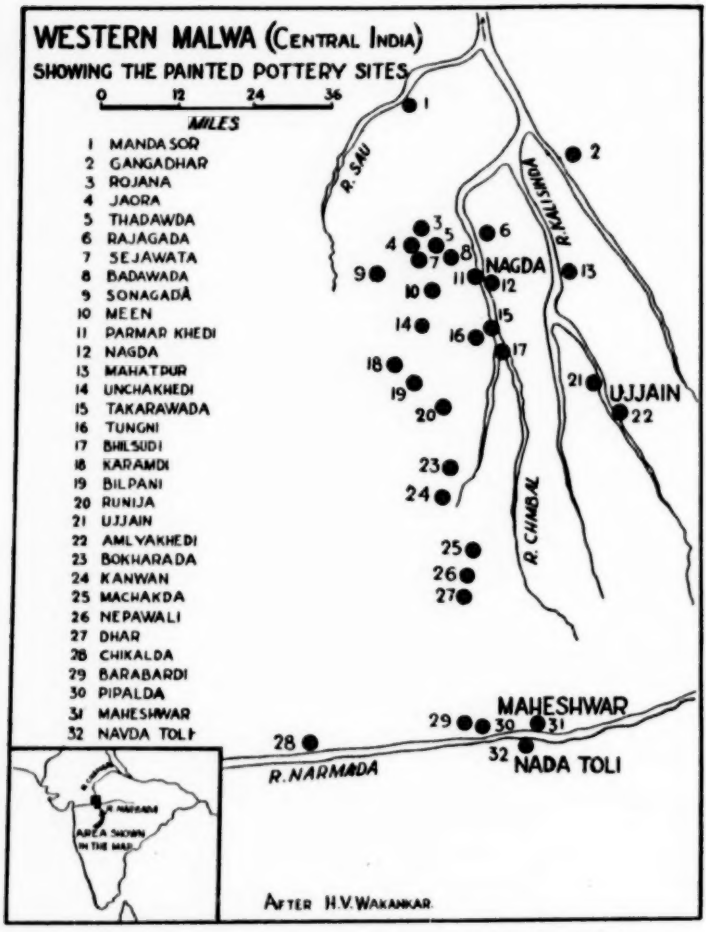


FIG. 4 Map showing painted pottery sites in Western Malwa (Central India).

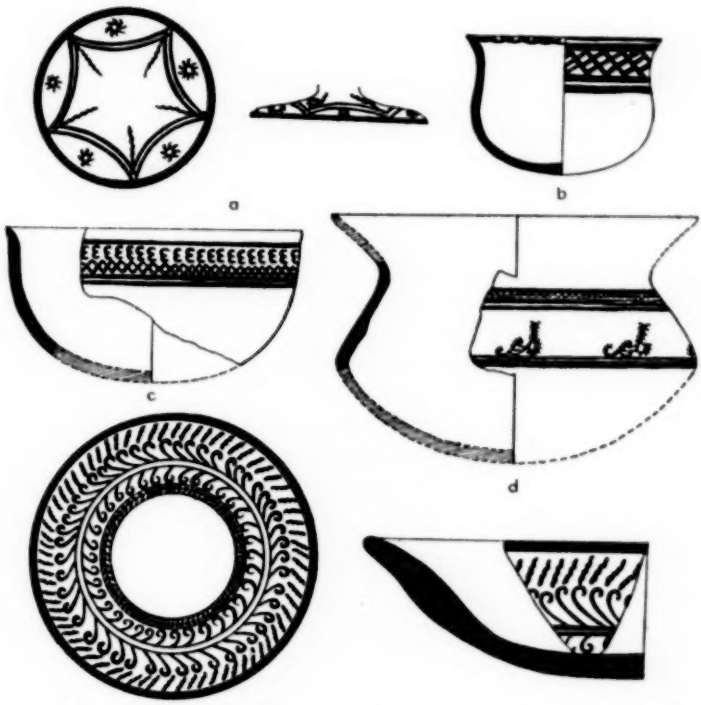


FIG. 5 Painted pottery. *a*, The base of a small bowl or dish with stand, decorated with design in black over red surface; *b*, bowl with slightly flaring rim and criss-cross decoration in black over a white creamy surface; *c*, rimless bowl with "sigma" and diamond decoration between bands in black over red; *d*, vessel with carinated shoulder and flaring rim, having a scorpion-like design in black over red; *e*, shallow bowl with volute design in black over red (*b-e*, reconstructions).

or outside. And it is indeed unfortunate that we can form no exact idea of the shapes of these spouted vessels.

Besides the painted ware, there is incised pottery. The noticeable feature of this is the extreme neatness and firmness with which the various incised decorations were executed.

The other characteristic features of this proto-historic culture are flattish, oval, mace-heads with an hour-glass section, round or cushion-like small stone balls, which are usually found battered at either end on the flattish periphery, sling stones, primitive querns, and plano-convex pestles, and beads of faience, steatite, and semi-precious stones such as carnelian, crystal, and agate. There is a very small amount of copper in the shape of hooks, chisels, and pins.

The next cultural stage is divisible stratigraphically into two cultural phases: Early and Late Historical. The former is defined by the presence of the famous Northern Black Polished ware, black-and-red ware, silver and copper punch-marked coins,[10] as well as other coins of the pre-Christian period. Iron tools and weapons now make their appearance. Structures—residential as well as religious—are built with large burnt and sunbaked bricks. The latter, a huge stupa, eighty-five feet in diameter, with the circumambulatory passage made of lime concrete, stood over the debris of the proto-historic period at Navda Toli. Residential structures were also provided with deep soakpits lined with bricks or pottery rings.

The chief feature of the Late Historical phase is the presence of the polished or finely burnished red ware, and the complete absence of the black-and-red pottery. The former includes some definitely imported Roman ware as well as imitations of it. The sprinkler with a side spout has been found at several sites in India[11]—such as Brahmagiri, Kolhapur, Kondapur, Baroda, and Amreli—but the ware with raised spike or line decoration is documented for the first time from Maheshwar.

The latest cultural stage appears after a break at Maheshwar, while at Navda Toli its remains on one mound directly overlie that of the early historical. These belong to the Muslim period, and need no further comment.

While the relative sequence of cultures and their important features have been briefly discussed above, it is difficult to estimate their span in years. The historical phases may be dated by the potsherds and coins as follows:

---

10 John Allan, *Catalogue of Coins of Ancient India* (London, 1936).

11 R. E. M. Wheeler, *Ancient India* (1947); H. D. Sankalia and M. G. Dikshit, *Excavations at Brahmapuri (Kolhapur)* (Poona, 1952); B. Subbarao, *Baroda Through the Ages* (Baroda, 1953), p. 62, fig. 27.

Period III

Phase B–Burnished or polished red ware	ca. 100-300 AD
Phase A–Black-and-red ware	ca. 200-400 BC
Northern Black Polished ware	ca. 200-400 BC
Punch-marked silver coin	ca. 200-400 BC

Period II

Proto-Historic
Painted pottery, microliths } Before 500 to 1500 BC or earlier
Stone mace-heads

Period I

Proto-Neolithic
Palaeolithic

On the Brahmagiri evidence the black-and-red polished ware has been dated to ca. 200 BC. While we can adopt this date as the latest period of its occurrence, its earlier date must now be pushed farther back, because of its association with the Northern Black Polished ware and punch-marked coin in the lowest layers at Maheshwar, and even with the painted ware and microliths. This, then, is one of the most important contributions of our work. Hitherto this ware was associated with megaliths found all over South India. Our work at Nasik and later Mr Deshpande's work at Bahal had made us feel that the ware—though not so fine as the megalithic, but otherwise technologically identical—should be of an earlier period, and probably of a northern origin. The evidence from Maheshwar seems to confirm this opinion.

At present Period II is difficult to date in terms of years. Its stratigraphical position as well as the depth of its debris—between five and eight feet—may be used provisionally, but ultimately its pottery will be the deciding factor. We have not studied it fully nor its analogues in type and decoration with similar pottery elsewhere. It may, however, be pointed out that it contains certain elements, for instance an ochre-washed pottery which has been found in the lowest layer at Nasik[12] and Hastinapur;[13] carinated bowls with thin walls, painted on the upper

12 See footnote 5 above.

13 For this information we are obliged to Mr B. B. Lal and Dr Y. D. Sharma, Superintendents, Archaeological Department, Government of India. Dr Sharma very kindly sent a few sherds to Dr Sankalia for study.

part, which are found at Jorwe,[14] and finally channel spouts painted on the outside which occur at Kodaikanal[15] in South India and Sialk[16] in Iran.

Finally it should be emphasized that Maheshwar and Navda Toli are not the only sites which bear this proto-historic culture. There is a site at Nagda, nearly one hundred miles north of Maheshwar, and thirty other sites in Western Malwa (see map, Fig. 4). Thus this Chalcolithic culture was fairly extensive, almost co-extensive with Madhya Bharat (Central India); and it remains for future work to determine its relation with the Harappa culture of the Indus valley. No relics which could be definitely attributed to the Puranic (Traditional) period turned up. This much is ascertained, however, that the Narmada region around Maheshwar enjoyed a kind of civilization well before the historic period, in which the Puranic kings might have played a part.

Deccan College Research Institute
Poona, India
Maharaja Sayajirao University
Baroda, India

14 See footnote 5.

15 A. Aiyappan, *Rude Stone Monuments of the Perumal Hills, Kodaikanal* (Quarterly Journal, Mythic Society, vol. 31, pl. II b).

16 R. Ghirshman, *Fouilles de Sialk* (Paris, 1939), vol. 2, pl. XVII, 10.

ALLEGED KIOWA-CROW AFFINITIES

ROBERT H. LOWIE

MOONEY is responsible for the widespread view that the Kiowa Indians lived permanently far to the north before migrating to their historic habitat; and that while in Montana they maintained peculiarly close connections with the Crow. That the Kiowa made such statements to Mooney some sixty years ago there is no reason to doubt. They gave similar information to Miss Marriott in 1935-36, to Battey in 1871. Dr Parsons heard the same story in 1927: "In the north two Kiowa chiefs quarreled over a piece of deer meat. One chief led his people away and never came back. These became the Crow tribe. . . . The Kiowa and the Crow have still the same words for thanks—*aho*." Indeed, during a few days at Anadarko, Oklahoma in 1915 I myself was told virtually the identical tale, including the assertion that after the separation the language had changed.[1]

Two questions must be distinguished here—the earlier residence in the north and the specific affinity with the Crow. As for the former, what is involved is of course not whether the ancestors of the Kiowa, along with other Indians, came from the north ten thousand or five thousand years ago; the question is whether in, say 1500 AD, they had their home in western Montana or, as has been alleged, even in the neighborhood of the Sarsi; whether their occupancy of the southern Plains falls into a very recent past. On this point, I have no new observation to offer: I merely accept whole-heartedly the suggestions made by Wissler and Kroeber, viz. that the tribe has been in the region of the Canadian and Arkansas Rivers for a considerable period; that their presence in the north "may have been due to their periodic wanderings" (Wissler); that after a temporary sojourn in the north they returned to their southern habitat, "legend retaining only the last of the events" (Kroeber). Linguistic evidence indicates kinship with the Tanoan, i.e. a Southwestern family, as argued by J. P. Harrington and accepted by Sapir, who even suggested an Aztec-Tanoan superstock including as one of its branches the Tanoan-Kiowa family.[2]

As for the specific relations of the Crow and Kiowa, the argument from the word for "thanks" is, of course, preposterous; Kiowa, incidentally, shares it not

1 Mooney, 1898, pp. 152-161; Parsons, 1929, p. 89; Marriott, 1945, p. viii; Battey, 1903, p. 105.

2 Wissler, 1914, p. 14; Kroeber, 1939, p. 80; Scott, 1911, p. 372; Harrington, 1910; Sapir, 1949, p. 173.

only with Crow, but also with Wind River Shoshone and Gros Ventre.[3] It is my intention in this paper to demonstrate that the same logical error underlies the attempt to establish a differential relationship between the two tribes, no matter what aspect of culture is examined. There are indeed many and even specific Kiowa parallels to Crow traits, but with very few exceptions they are shared by other Plains tribes, often along with details pointing to groups other than the Crow. Since Mooney's thesis rests on tradition, I ought to premise that while the briefest of stays with the Kiowa sufficed to corroborate that the story is indeed part of their folklore, I never once heard the Crow refer to the Kiowa in this connection, though I spent seven or eight field sessions with them. They do not indeed lack the motif of a schism resulting from a dispute over the division of food, but the rupture is between the Crow and the Hidatsa![4] As for the Kiowa, they play so slight a figure in Crow thought that though constant mention is made of the Hidatsa, the Dakota, the Cheyenne, the Shoshone, and the Piegan, references to the Kiowa hardly ever occurred during my visits.

A thoroughgoing comparison of the two cultures is not possible because no systematic study of the Kiowa has ever been published, though much material was doubtless collected by the expedition headed by Dr Alexander Lesser in 1935. Nevertheless by piecing together the data gathered by Battey, Mooney, Marriott, Scott, Parsons, Richardson, and Mishkin enough is available for the present purpose of determining whether the resemblances between Kiowa and Crow suggest greater intimacy of these peoples in the past than obtains between almost any two Plains tribes.

Information is probably most defective on material culture, but what we have does not support Mooney's thesis. In her admirable book Miss Marriott tersely tells us that Kiowa material culture "is certainly that of the Southern Plains." Some of the traits referred to in her sketches—such as the bows and cradles of Osage orange wood or the use of mesquite meal as raiders' viaticum—are of course geographically rooted, but it still holds true that what is known does not point at a specific relationship with the Crow.[5]

As to Kiowa art also, printed information is lamentably meager—a condition probably remediable by a scrutiny of museum collections. What little can be gleaned from the literature, however, again fails to indicate differential kinship with the Crow. According to Kroeber, the Kiowa, like the Comanche and Wichita, use little solid beadwork, substituting "simple and small designs as isolated figures to give variety to the narrow white stripes and edgings that characterize their

3 Shimkin, 1953, p. 424; Flannery, 1941, p. 35.
4 Lowie, 1918, pp. 272-275.
5 Marriott, 1945, pp. viii, 35, 136.

embroidery." Moccasins often depend on fringes and painting for decoration as much as on beadwork, as in Comanche specimens; Comanche, Kiowa, and other southern tribes practically employ only stripe-border designs, and the beading serves "mainly for outlining or edging . . . so that a turn is given to their style which sets them apart from the other tribes considered." On navel amulets the Kiowa embroider rhomboids of Arapaho and Shoshone type. Spier's study of parfleches reveals no closer relationship with the Crow than with the Kutenai, Sarsi, Gros Ventre, Wind River Shoshone, and Cheyenne; indeed, design elements are more frequently shared with the Blackfoot and the Arapaho.[6]

Kiowa and Crow warfare both involved customs so specific that their common ultimate origin must be accepted, but nothing indicates a *direct* historical connection. For example, after a killing the returning victors in either tribe painted their faces black, but the same holds for the Arapaho, Cheyenne, and various other groups.[7] Formal drumming on a hide before going on a warparty or as an element of the Sun Dance had a restricted distribution, but the resemblance on this point is stronger with the Arapaho, Blackfoot, Shoshone, Nez Percé, and Plains Cree, who practised the performance as a serious act, whereas the Crow regarded "hide-beating" merely as a form of amusement.[8] The list of honorific exploits given by Mishkin likewise indicates no differential relationship. Kiowa raiders regularly started on horseback, the Crow preponderantly afoot.[9]

At first blush it seems a specific parallel that elders in our two tribes impressed on their sons the superiority of a young warrior's death to a man's dying in old age. But this feature too is a widespread element of Plains ideology. An Omaha father thus urged his son to go on the warpath: "It will be good for you to die when young." The Hidatsa expressed the identical theory; so did the Cheyenne. A Kiowa death song in which fleeting human life is contrasted with the permanence of moon, sun, and earth vaguely resembles a Crow equivalent, but though the sentiment is the same—a depreciatory comparison of man's mortal nature with the persistence of cosmic phenomena—the phrasing is too different to demonstrate immediate contact. Moreover, parallels hardly less striking appear in other sections of the area. The Teton sang, "The old men say the earth only endures"; the Mandan Black Mouth society had a song that elliptically suggests the comparison: "Earth always endures"; the Little Dogs of the same people

6 Kroeber, 1908, pp. 154 f., 156, 158, 160, 161, 167; Spier, 1925, p. 108.

7 Marriott, 1945, pp. 39, 106; Mooney, 1898, p. 291; Kroeber, 1902-1907, p. 23; Grinnell, 1923, vol. 2, p. 197.

8 Battey, 1903, p. 171; Mooney, 1898, p. 312; Marriott, 1945, pp. 32, 105; Lowie, 1912, p. 244; Shimkin, 1953, p. 415; Methvin, 1899, p. 69.

9 Mishkin, 1940, pp. 31, 39, 59.

had borrowed these Hidatsa words: "No one lives forever; whatever may happen, I shall go."[10]

Comparison of military societies is hampered by dearth of Kiowa data, but a few significant conclusions emerge from a consideration of both the system and the individual sodalities. The systems agree in dispensing with purchase and, except for a boys' organization, with age-grading. Of the five other Kiowa societies, one—the qo'itseñko—includes a limited number of men, all pledged to be exceptionally brave and accordingly enjoying the highest prestige; the four remaining organizations are coördinate. Rivalry between two societies—conspicuous among the Crow, Dakota, Iowa, and Ponca—is not recorded for the Kiowa.[11] Of the societies as separate units, only the Kiowa Rabbits and the qo'itseñko are sufficiently known to warrant discussion. The former correspond functionally to the Crow Stone Hammers; the unofficial boys' companies of the Oglala; the Mandan Crazy Dogs of earlier times, who like the Rabbits were supervised by older persons; the Piegan Pigeons with their four "old men comrades"; the Mosquitoes of all three Blackfoot tribes in 1833; possibly to the Arapaho Kitfoxes and Blackbirds; the unorganized Gros Ventre companies with their older mentors; the wholly unorganized Cree Mosquitoes, bent on snatching food from their campmates.[12] In short, various Plains tribes had gangs of youngsters banded together for mimicry of the recognized adults' societies or some other collective action; in some tribes the adults somehow incorporated them into their scheme, while other tribes ignored them. In any case, the Rabbits and the Stone Hammers were alike only in being junior groups.

As for the qo'itseñko, their name is variously translated as "Crazy Dogs," "Chief Dogs," "Real or Principal Dogs," "Horses," "Big Horses," "Elks," or not translated at all. Mooney limits the membership to ten, as does Miss Marriott, whereas my informants' estimates varied between fifteen and thirty while Dr Parsons's authorities set the figure at about fifty. It seems to me that Mooney's statements should take precedence. His findings date back to a time when he was able to consult members and their contemporaries. What is more, *all* the members were pledged to obligatory bravery, whence their preëminence. In a population

10 Mishkin, 1940, p. 47; Dorsey, 1884, p. 333; Kroeber, 1902-1907, p. 23; Grinnell, 1923, p. 5; Lowie, 1917, p. 83; Marriott, 1945, pp. 34, 105, 121, 284; Wissler, ed., 1912-1916, p. 305; Densmore, 1918, pp. 357, 394, 454, 500, 509; *id.*, 1923, p. 50.

11 Wissler, ed., 1912-1916, pp. 169 et seq., 197, 643, 697, 787, 841-851, 874; Mooney, 1898, p. 229 f; Battey, 1903, p. 185 f; Marriott, 1945, pp. ix, 4, 5 f., 7, 31 ff., 41, 56, 85, 95, 101, 102, 107, 130, 174.

12 Wissler, ed., 1912-1916, pp. 28, 306, 369, 371, 377; Kroeber, 1902-1907, p. 181; Hilger, 1952, pp. 116, 226; Flannery, 1953, p. 37 f; Mandelbaum, 1940, p. 230.

of 1,500 we may assume the total number of warriors to have been about 300. To be one man in thirty would be a real distinction, while being one in six would hardly be. Further, there were ten tribal medicine bundles, whose number might easily have influenced that of the qo'itseñko.

In any case the character of the organization is unmistakable. As some renderings of its name indicate, it is a "Dog" society. Its differentiæ are: sashes to be fixed in battle so as to prevent retreat, dewclaw rattles, eagle-bone whistles, and backward speech. All but the last of these (which, however, is characteristic of the unorganized Crow Crazy Dogs) appear in the Crow Big Dogs; every one turns up in the Dog society of the Hidatsa. The sashes, dewclaw rattles, and whistles are shared by the Dog organizations of the Mandan, Arapaho, Gros Ventre, Cheyenne, and Arikara; the combination is likewise found in the Miwatana society of the Western Dakota. There is thus no question of a differential similarity between Kiowa and Crow in this respect. Finally, we learn that the Kiowa did not have the organization prior to 1846, a fact which would automatically bar borrowing from the Crow or vice versa in the prehistoric period. But even if the implication is merely the reorganization of a preëxisting society at that date, nothing suggests that the Crazy Dogs of the Kiowa were derived from the Crow.[13]

On social structure and social customs information is somewhat fuller than on most aspects of Kiowa life, and here we meet striking differences from Crow norms. The Crow have strictly matrilineal clans, the Kiowa no clans whatsoever, only "relatively fluid" bands. Kinship nomenclatures could hardly be much wider apart. Like the Pawnee, but unlike the Crow, the Kiowa fail to distinguish elder and younger siblings. Like the Shoshone, Comanche, Arapaho, and Cheyenne, they identify cross- with parallel-cousins, while the Crow not only separate them, but put two types of cross-cousins into distinct generations. A single term for mother's brother and sister's child constitutes a parallel with Shoshone, not Crow; the classification of great-grandchildren with siblings recalls Pawnee. On the assumption of intimate contacts in the past, this disparity forcibly contrasts with the far-reaching coincidence of western Woodland Algonquin and Southern Siouan terminologies.[14]

It is equally instructive to collate usages within the family circle. Conspicuous in Kiowa life is the "beloved child"—the child singled out for preferential treatment, parents lavishing attentions upon him, relieving him of drudgery, giving

13 Wissler, ed., 1912-1916, p. 920; Marriott, 1945, pp. 7, 294.

14 Richardson, 1940, p. 6 ff; Lowie, 1923, pp. 279-281; Parsons, 1929, p. 144 et seq; Eggan, ed., 1937, p. 42; Hoebel, 1939, p. 443.

away property to enhance his and their own kudos. Marriott, Richardson, and Mishkin all stress the practise. It likewise flourishes among the Dakota, Blackfoot, and Gros Ventre, but not among the Crow.[15] The relations between adult brother and sister seem to differ in the two tribes. Though some of Parsons's informants credit their people with taboos comparable to those of the Crow, the allegation contradicts her statement that "a brother will tease his sister about her sweetheart." What clinches the matter is the repeated evidence in Marriott's book of conversations between siblings of opposite sex. On the other hand, the Crow completely lack the Kiowa taboo between father-in-law and daughter-in-law that persisted at least as late as 1936.[16]

A Kiowa husband was privileged to cut off an adulterous wife's nose. Such was Arapaho and Blackfoot practice also, but not that of the Crow.[17]

Turning to religion and ceremonial, we find again a series of traits shared by our two tribes, but so widespread that the parallelism lacks cogency with reference to the thesis I am challenging. The sweatbath, the association of owls with the dead and of buffalo with doctoring, the special significance of the number *four*, fall under this head. As regards specific resemblances there seems to be merely one—the use of a sacred image ("doll") as an essential of the Sun Dance; this will be discussed presently. An order, embracing many chapters, whose members plant a sacred tobacco identified with a star is of outstanding importance among the Crow. They also attach great significance to theromorphic rocks supposed capable of reproducing themselves and of luring buffalo. Nothing comparable seems to have been recorded for the Kiowa. It could be argued that the lack results from the fragmentary nature of Kiowa data. But if we reverse the procedure, taking distinctive Kiowa features as a starting-point, the same conclusion emerges.

The notion of exalting ten medicine bundles as tribal palladia is foreign to the Crow; it savors much more of Pawnee models. The tribal rule against killing and eating bears—a taboo whose breach is supposed to have wrecked a joint warparty with the Comanche—does not occur among the Crow. Though certain transgressions by them were supposed to bring supernatural penalties, there was no crystallization of a concept equivalent to Kiowa *taido*.[18]

15 Marriott, 1945, pp. 52, 54, 86, 88, 91, 101 et seq, 155; Mishkin, 1940, p. 51 f; Richardson, 1940, pp. 12, 93, 129; Deloria, 1932, pp. 41, 156, 175; Goldfrank, 1945, p. 59; Devereux, 1951, pp. 63, 118, 140, 321; Olden, 1918, p. 45 et seq; Wissler, 1912, p. 288 f; Flannery, 1941, pp. 33-37.

16 Marriott, 1945, pp. 58 f., 97 f., 209, 250, 259, 270.

17 Parsons, 1929, p. 136; Marriott, 1945, p. 82; Richardson, 1940, pp. 3, 67, 73, 84; Kroeber, 1902-1907, p. 13; Wissler, 1911, p. 10.

18 Marriott, 1945, pp. viii, 3 et seq; Richardson, 1940, pp. 10 f, 130 et passim; Battey, 1903, p. 323.

We now come to the Sun Dance doll. Restricted to the versions of the festival found among the Kiowa, Crow, Wind River Shoshone, and Kutenai, this feature does constitute strong evidence of historical connection—of direct connection since the Shoshone and the Kutenai, being peripheral groups, may be eliminated as donors. There is thus no reason to reject the Kiowa tradition on this element. However, two important points must be noted. The tradition avers, indeed, that the image came from the Crow, but also that it came via an old Arapaho. Secondly, as Scott already showed, the Sun Dance of the Kiowa differed materially from that of the Crow, Blackfoot, and other groups. Apart from the doll, the Kiowa performance is not peculiarly akin to the Crow. Two independent tabulations, by Spier and by Shimkin, undertaken with a somewhat different range of tribes, refute any special closeness between the two festivals. According to Spier they share only 11 items against 14 Kiowa-Gros Ventre, 19 Kiowa-Cheyenne, 23 Kiowa-Arapaho parallels. Shimkin's study yields 15 Kiowa-Crow correspondences, 14 between Kiowa and Blackfoot, 20 Shoshone-Kiowa and Arapaho-Kiowa parallels. Discounting the figure for Shoshone because they seem to have derived the ceremony from the Kiowa, we find that two independent investigators established maximum affinity between the Kiowa and the Arapaho ceremonies. This is not surprising, of course, if an Arapaho introduced the doll as an essential ingredient of the Sun Dance.[19]

Any such statistical approach suffers from the equal weighting of elements of possibly very different value. In this case it is easily supplemented by viewing several manifestly important traits. The Kiowa theoretically held their Dance annually, though circumstances a number of times inhibited the performance and supernatural prompting occasionally stimulated two Dances in one year; the avowed object was "to obtain material benefits from, or through the medicine doll." The Crow held a Sun Dance only if a mourner had pledged it for the single purpose of revenging the death of a beloved relative at the hands of any hostile people. Thus several years could easily elapse between successive performances. The pledger might appeal to any of several owners of doll bundles, who acted as the director of the festival, whereas his Kiowa counterpart was also "the principal suppliant." These differences in aim and organization go with differences in objective features: Scott rightly emphasizes the complete absence of self-torture in the Kiowa festival, in contrast to the prominence of this element in the Crow and most other equivalents. On the other hand, the Crow have

19 Scott, 1911, p. 353; Shimkin, 1953, p. 415 ff; Turney-High, 1941, p. 178 et seq; Spier, 1921b.

nothing corresponding to the daily "killing" of dancers by waving fans at them.[20] To sum up, apart from the image there is no distinctive relationship between the two performances.

Kiowa tales have already been dealt with by Dr Erminie Voegelin,[21] who pursued precisely the line of reasoning followed in the present article. She concluded that parallels relevant to our discussion are due "merely to general Plains influence" rather than to a close association of the Kiowa and Crow. Since she has published only a summary of her investigations a few supplementary remarks seem permissible.

In the first place, relevant resemblances are offset by differences that indicate influences from other directions. Thus, the myth about the son of a celestial being and an Indian woman is told by both tribes with identical details that could not have originated independently: a porcupine climbing up a magically growing tree lures the heroine into the sky; she transgresses a taboo against digging up a plant that plugs the sky-hole; peering down, she grows homesick as she sees Indians playing the hoop game; her irate husband bids a rock kill her, but not her child as she dangles from a rope that was to carry her down to earth; the boy continues to suckle at the corpse's breasts; an old woman who lives nearby determines his sex by watching whether he will pick up the ball of the feminine shinny game or a bow.[22] But this adoptive grandmother is differently conceived by the two tribes. The Kiowa identify her with Spider (Old) Woman, unknown to the Crow but conspicuous in Pueblo myth as the benevolent helper of distressed mortals;[23] her Crow counterpart is in league with the evil beings whom the heaven-born hero is destined to destroy. It is, of course, possible that the Crow have reinterpreted the character of the old woman; the point in the present context is that the immediate affinity of the Kiowa character is with a Southwestern prototype. Further, the Kiowa hero throws a ring that splits him in two, so that subsequent adventures devolve on a pair of heroes. This "Split Boy" motif allies the Kiowa with Shoshone and Southern Paiute, not with the Crow, whose twin heroes are genuine twins.[24]

---

20 Mooney, 1898, p. 279; Marriott, 1945, p. 293 et seq; Scott, 1911, p. 366; Spier, 1921a, p. 448.

21 Voegelin, 1933.

22 Kroeber, 1907, pp. 90-94; Bowers, 1950, p. 197 et seq; Beckwith, 1932, p. 117 et seq; Lowie, 1942, pp. 2-18.

23 Parsons, 1929, pp. 2, 23, 25, 54, 77; *id.*, 1939, p. 192 f et passim.

24 Shimkin, 1947, pp. 332, 338; Lowie, 1924, p. 189 f.

When features of Kiowa folklore point north they often suggest contacts other than with the Crow. So far as I know, the story of the scout fed by the child of a hostile tribe and so deeply moved as to save the parents appears only in Parsons' Kiowa and Wissler's Blackfoot collection. Finally, the Kiowa Trickster is neither called after the coyote like the Crow counterpart nor does he turn into a wolf, but like Western Algonquin equivalents plays a distinctly human part.[25]

To revert to the argument pursued throughout this paper, the mythological elements common to Kiowa and Crow are as a rule common to other groups, sometimes even to other culture areas. For example, the Trickster's getting stuck in a skull harboring dancing mice; his gaining food by cunning, only to be cheated of his ill-gotten booty while asleep or imprisoned by trees; his tumbling into the water from a height when scared by birds; his race with a fox shamming lameness —these are all widely diffused episodes. Such Kiowa tales as Bloodclot (apparently known to the Crow only as a Blackfoot story), the Bear Woman, the Rolling Skull, the Escape up Trees are found among Blackfoot, Assiniboine, and Gros Ventre. Even when most specific parallels of limited distribution turn up, the same consideration applies. It is certainly no coincidence that Red-Hair is decapitated by a hero disguised as a woman, that his brothers suspect the epicene wife because of her masculine arms, that the slayer is aided by ants in both Kiowa and Crow versions; but precisely the most convincing identities of detail occur also in Blackfoot and Arapaho collections.[26]

Assuredly there may be items peculiar to the Kiowa and Crow; possibly the curious coincidence, noted by Parsons, of a mole being referred to as a bird, falls under this head.[27] Further, it is of course conceivable that elements common to Kiowa, Crow, Arapaho, and Blackfoot were transmitted to the Kiowa by the Crow. But we have no evidence that such was the case. Voegelin's inference that Arapaho folklore is about as close as Crow folklore to that of the Kiowa and that Gros Ventre folklore may even be closer still holds.

To sum up the general argument, the Kiowa may well have lived considerably farther north for a comparatively short period within the last five hundred years and incidentally had contacts with the Crow. However, that these contacts were peculiarly intimate is demonstrated neither by Crow tradition, which fails to support Kiowa assertions, nor by a comparison of Kiowa with Crow culture.

---

25 Parsons, 1929, pp. 82-85; Wissler and Duvall, 1908, pp. 11 f, 160 f.

26 Parsons, 1929, pp. 48, 78; Wissler and Duvall, 1908, p. 129; Kroeber and Dorsey, 1903, p. 131; Lowie, 1918, pp. 141, 203; Beckwith, 1932, p. 152.

27 Parsons, 1929, p. 47 f.

Bibliography

Battey, Thomas C.
1903 *The Life and Adventures of a Quaker among the Indians* (Boston: Lee and Shepard).

Beckwith, Martha W.
1932 *Myths and Ceremonies of the Mandan and Hidatsa* (Publications of Folk-Lore Foundation, Vassar College, no. 12).

Bowers, Alfred W.
1950 *Mandan Social and Ceremonial Organization* (Chicago: University of Chicago Press).

Deloria, Ella
1932 *Dakota Texts* (New York: G. E. Stechert).

Densmore, Frances
1918 *Teton Sioux Music* (Bulletin, Bureau of American Ethnology, no. 61).
1923 *Mandan and Hidatsa Music* (Bulletin, Bureau of American Ethnology, no. 80).

Devereux, George
1951 *Reality and Dream* (New York: International Universities Press).

Dorsey, J. O.
1884 *Omaha Sociology* (3rd Annual Report, Bureau of American Ethnology, pp. 211-370).

Eggan, Fred., ed.
1937 *Social Anthropology of North American Tribes* (Chicago: University of Chicago Press).

Flannery, Regina
1941 *The Dearly-loved Child among the Gros Ventres of Montana* (Primitive Man, vol. 14, pp. 33-37).
1953 *The Gros Ventres of Montana: Part I* (Anthropological Series, Catholic University of America, no. 15).

Goldfrank, Esther S.
1945 *Changing Configurations in the Social Organization of the Blackfoot Tribe during the Reserve Period* (New York: J. J. Augustin).

Grinnell, George Bird
1923 *The Cheyenne Indians* (New Haven: Yale University Press).

Harrington, J. P.
1910 *On Phonetic and Lexic Resemblances between Kiowan and Tanoan* (American Anthropologist, vol. 12, pp. 119-123).

Hilger, M. Inez
1952 *Arapaho Child Life and its Cultural Background* (Bulletin, Bureau of American Ethnology, no. 148).

Hoebel, E. Adamson
1939 *Comanche and Hekandika Shoshone Relationship Systems* (American Anthropologist, vol. 41, pp. 440-451).

KROEBER, A. L.
1902-1907 *The Arapaho* (Bulletin, American Museum of Natural History, vol. 18, pp. 1-229, 279-454).
1907 *Gros Ventre Myths and Tales* (Anthropological Papers, American Museum of Natural History, vol. 1, pp. 55-139).
1908 *Ethnology of the Gros Ventre* (Anthropological Papers, American Museum of Natural History, vol. 1, pp. 141-281).
1939 *Cultural and Natural Areas of Native North America* (University of California Publications in American Archaeology and Ethnology, vol. 38, pp. 1-242)

KROEBER, A. L., AND DORSEY, G. A.
1903 *Traditions of the Arapaho* (Publications of the Field Columbian Museum, Anthropological Series, vol. 5)

LOWIE, ROBERT H.
1912 *Social Life of the Crow Indians* (Anthropological Papers, American Museum of Natural History, vol. 9, pp. 181-248).
1917 *Notes on the Social Organization and Customs of the Mandan, Hidatsa, and Crow Indians* (Anthropological Papers, American Museum of Natural History, vol. 21, pp. 1-99)
1918 *Myths and Traditions of the Crow Indians* (Anthropological Papers, American Museum of Natural History, vol. 25, pp. 1-308).
1923 *A Note on Kiowa Kinship Usages* (American Anthropologist, vol. 25, pp. 279-281)
1924 *Shoshonean Tales* (Journal of American Folk-Lore, vol. 37, pp. 1-242).
1942 *Studies in Plains Indian Folklore* (University of California Publications in American Archaeology and Ethnology, vol. 40, pp. 1-28).

MANDELBAUM, DAVID G.
1940 *The Plains Cree* (Anthropological Papers, American Museum of Natural History, vol. 37, pp. 157-316).

MARRIOTT, ALICE
1945 *The Ten Grandmothers* (Norman: University of Oklahoma Press).

METHVIN, J. J.
1899 *Andele, or the Mexican-Kiowa Captive* (Louisville: Pentecostal Herald Press).

MISHKIN, BERNARD
1940 *Rank and Warfare among the Plains Indians* (New York: J. J. Augustin).

MOONEY, JAMES
1898 *Calendar History of the Kiowa Indians* (17th Annual Report, Bureau of American Ethnology, pp. 141-445).

OLDEN, SARAH E.
1918 *The People of Tipi Sapa, the Dakota* (Milwaukee: Morehouse Publishing Company).

PARSONS, ELSIE CLEWS
1929 *Kiowa Tales* (Memoirs, American Folk-Lore Society, vol. 22).

1939 *Pueblo Indian Religion* (Chicago: University of Chicago Press).

RICHARDSON, JANE
1940 *Law and Status among the Kiowa Indians* (New York: J. J. Augustin).

SAPIR, EDWARD
1949 *Selected Writings* (Berkeley: University of California Press).

SCOTT, HUGH LENOX
1911 *Notes on the Kado, or Sun Dance of the Kiowa* (American Anthropologist, vol. 13, pp. 345-379).

SHIMKIN, DEMITRI B.
1947 *Wind River Shoshone Literary Forms; an Introduction* (Journal, Washington Academy of Sciences, vol. 37, pp. 329-352).
1953 *The Wind River Shoshone Sun Dance* (Bulletin, Bureau of American Ethnology, no. 151, pp. 397-484).

SPIER, LESLIE
1921a *Notes on the Kiowa Sun Dance* (Anthropological Papers, American Museum of Natural History, vol. 16, pp. 433-450).
1921b *The Sun Dance of the Plains Indians: its Development and Diffusion* (Anthropological Papers, American Museum of Natural History, vol. 16, pp. 451-527).
1925 *An Analysis of Plains Indian Parfleche Decoration* (University of Washington Publications in Anthropology, vol. 1, pp. 89-112).

TURNEY-HIGH, HARRY H
1941 *Ethnography of the Kutenai* (Memoirs, American Anthropological Association, no. 56).

VOEGELIN, ERMINIE
1933 *Kiowa-Crow Mythological Affiliations* (American Anthropologist, vol. 35, pp. 470-474).

WISSLER, CLARK
1911 *The Social Life of the Blackfoot Indians* (Anthropological Papers, American Museum of Natural History, vol. 7, pp. 1-64).
1912 *Ceremonial Bundles of the Blackfoot Indians* (Anthropological Papers, American Museum of Natural History, vol. 7, pp. 65-289).
1914 *The Influence of the Horse in the Development of Plains Culture* (American Anthropologist, vol. 16, pp. 1-25).

WISSLER, CLARK, ED.
1912-1916 *Societies of the Plains Indians* (Anthropological Papers, American Museum of Natural History, vol. 11).

WISSLER, CLARK, AND DUVALL, D. C.
1908 *Mythology of the Blackfoot Indians* (Anthropological Papers, American Museum of Natural History, vol. 2, pp. 1-163).

UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

A PATTERN OF DIFFUSION-ACCULTURATION[1]

GORDON R. WILLEY

THE PHENOMENA of diffusion and acculturation are the stock-in-trade of the archaeologist, but he usually examines them with an eye toward historical interrelationships rather than from the analytical point of view of pattern and function. While it is evident that the limitations of archaeological data and archaeological inference preclude the individual and psychological points of reference by which studies of acculturation and culture change are often plotted, there is, nevertheless, an area of the problem which can be explored with the help of prehistory. Although there is no clear unanimity of opinion among ethnologists and social anthropologists as to the relationships of the concepts of diffusion and acculturation,[2] Herskovits[3] has suggested that diffusion is "achieved cultural transmission" while acculturation is "cultural transmission in process." This may be a useful distinction in some circumstances, but it ignores a part of the full series of events—a series which can only be appreciated from a time-depth perspective. The archaeologist, by the nature of his subject matter, must always deal with the "achieved," but for him the dynamic aspect lies in the observation of the "before-during-after" sequence of culture contact. Herein lies his potential contribution to the study of culture change and culture synthesis.

It is the intent of this essay to investigate processes of diffusion-acculturation as these are reflected in the prehistoric sequences of three widely separated American regions. It will be seen that these instances, although differing in content, possess common structural features and that these features suggest a pattern. This pattern appears to be one of several into which the events of culture contact and results of contact might be classified.

The three American regions selected for study are central Georgia, northern Yucatan, and north coastal Peru. All of these are small parts of much larger culture area groupings: the southeastern United States, Meso-America, and Peru, respectively. Each region had a culture history peculiar to itself and at the same time related to the larger area which encompassed it. In each case the action with which we are concerned was the result of forces generated within the larger area

1 The author is indebted to A. M. Tozzer, H. E. D. Pollock, Tatiana Proskouriakoff, and C. H. Fairbanks for their comments and criticisms on this paper.

2 Beals, 1953, pp. 625 ff.

3 Herskovits, 1948, pp. 523 ff.

and brought to impinge upon the smaller region. All of the instances of culture contact lie in the pre-Columbian past and are not involved with the late fifteenth and early sixteenth century incursions of the Europeans.

CENTRAL GEORGIA

In central Georgia the particular events we have selected serve to distinguish one major culture period from the next. At the time in question, most of the area that is now central and south Georgia, together with portions of bordering states, was the homeland of the prehistoric Swift Creek culture.[4] Swift Creek is a Southeastern Woodland culture, the last of a local Georgia Woodland series that succeeds a still earlier Archaic period. Guess-date estimates vary, and are not of great importance in this discussion, but a time range of 400 to 1000 AD has been suggested for the Georgia Swift Creek development.[5] The Swift Creek people were primarily hunters and gatherers although they may have practiced a minimal maize horticulture. Their villages are numerous but not large. Chipped stone tools and weapons are found in abundance, but ground stone celts are rare. Bannerstones and boatstones, the probable throwing-stick weights, imply the use of that implement. Pottery was moderately plentiful and tended to be limited to the deep conoidal-based jar of the Woodland genre. In some regions burial mounds were constructed, and this trait appears consistent with what we know of the East and Southeast in general for this approximate time horizon. Swift Creek culture is thought to be roughly contemporaneous with Hopewell of the Ohio Valley. Toward the close of Swift Creek times the construction of temple mounds became associated with the culture. It is likely that the appearance of this feature followed in the wake of the events to be described.

The first of these events, as nearly as we can trace them in the archaeological record, was the establishment in the Macon locality of a large town site of the Macon Plateau culture. The Macon site covered several acres and was encircled by ditched (and probably earth wall) defenses. It incorporated seven flat-topped pyramidal or temple mounds, special semi-subterranean circular earthlodges, and evidences of dwelling structures. The entire site and the artifacts found within it stand in stark relief against the old Woodland, Swift Creek background. In the zone of the site proper its superposition over the earlier Swift Creek settlements is clear, and the physical as well as the cultural stratigraphy indicates a sharp cleavage with the past. The picture is not one of cultural amalgamation but

4 See Fairbanks, 1952, pp. 287-290, for a concise description of the Swift Creek culture and its position in the Georgia sequence.

5 Griffin, 1952, fig. 205.

of sudden interruption and new beginnings within another tradition. Fairbanks sums this up in saying:

> Macon Plateau makes a definite break with the old hunting-collecting economy and has full-fledged agriculture. There is evidence of a field inside the town but the bulk of the gardens must have been outside and the mound group probably served as an assembly point for scattered family groups. The large mounds, fortifications, and ceremonial buildings indicate an economy with sufficient leisure for non-subsistence pursuits. They probably had a priesthood who ran things in the ceremonial center and may have had an elaborate political and military organization. The whole system was much more complicated than anything that had preceded it in central Georgia.[6]

The Macon Plateau townsmen introduced a new art style (the "Southern Cult") in connection with their ceremonialism. In more ordinary manufactures they placed less emphasis on flint chipping than their predecessors, made numerous ground stone celts including the bi-lobed spud, and manufactured pottery completely unlike that of the Swift Creek inhabitants. Macon Plateau pottery is in a Mississippian tradition. It is generally smooth-surfaced, often shell-tempered, and features shouldered jars, bowls, bottles, loop handles, and animal effigy adornos.

There is little doubt but that the Macon Plateau people were invaders into central Georgia. The presence of their big, fortified town and ceremonial center is like a tiny island in a sea of the simpler Swift Creek villages. Except for one other Macon Plateau site, smaller than the first, two miles distant, and also fortified, no other sites of the Macon Plateau culture have ever been discovered in Georgia, a state in which archaeological survey is reasonably well advanced. There is good evidence that the Swift Creek communities continued coincident with and after the advent of the Macon Plateau intruders, for coastal and south Georgia seem to have been strongholds for the Swift Creek traditions, particularly in stamped pottery. Some change gradually seeped into these regions, and the presence of a temple mound at the Kolomoki site in south Georgia suggests a possible diffusion from Macon.[7] If so, the processes of culture spread and change were entirely different from those attendant upon the founding of the Macon Plateau site. Kolomoki represents a blend of Swift Creek culture with a current of new ideas, but Macon Plateau is a total replacement of Swift Creek.

The Macon Plateau push into central Georgia is believed to have come from

---

6 Fairbanks, *op. cit.*

7 Sears, 1953, p. 228, believes Kolomoki and its temple mound to be definitely later than Macon Plateau. The Evelyn Site, near Brunswick, Georgia, is perhaps another example of a late Swift Creek temple mound (Fairbanks, *op. cit.*, p. 287).

the north or northwest. Perhaps western Tennessee and the central Mississippi Valley were the former heartlands of the culture. Certainly, central and east Tennesseean culture groups of about the same time period show close resemblances to Macon Plateau.[8] The abruptness of the culture change strongly suggests a population movement, not a cultural diffusion without peoples. There is, as yet, insufficient physical anthropological data from central Georgia to confirm this; but skeletal evidence from Tennessee supports such a migration, if indirectly.[9] Both archaeologists and ethnologists have seen in the establishment of the Macon Plateau site the first entry of Muskogean peoples into Georgia. Although this is further surmise, it is highly probable.

Of equal interest are the developments which followed the arrival of Macon Plateau culture in the Georgia region. This succeeding period is known as the Lamar, and Lamar[10] culture represents a firmly cemented mixture of Macon Plateau and Swift Creek traits. The time of Macon Plateau is estimated at about 1000 to 1300 AD. Lamar, whose upper limits are known to overlap with the first Spanish *entradas,* extends, then, from 1300 to 1600 AD or later. Unlike Macon Plateau, Lamar and closely related sites are found throughout Georgia and north and east into the Carolinas. Some of them are small villages, like the Swift Creek sites, but many are sizable towns with temple mounds and, sometimes, palisades. One of the most striking amalgams of the new culture is the pottery. In vessel forms and ornamentation it incorporates the intrusive Macon Plateau and the resident Swift Creek features. For example, complicated stamped surfacing, while missing from Macon Plateau ceramics, becomes a common element of Lamar. There are, to be sure, other influences in Lamar in addition to Macon Plateau and Swift Creek. Some of these appear to be ideas from the north and the west which followed in the wake of the Macon Plateau migration, and probably derived from related Mississippian sources. Significant, however, is the fact that Lamar is not an isolated and alien projection into frontier territory but a local Georgian synthesis. It is primarily the acculturative result of the Macon Plateau-Swift Creek culture contact.

NORTHERN YUCATAN

The prehistory of Yucatan begins with the agriculturally based Formative cultures which undoubtedly go back several centuries BC. An early Maya occupa-

8 See Webb, 1938, and Lewis and Kneberg, 1946.

9 See Lewis and Kneberg, 1946, and Newman and Snow, 1942.

10 Fairbanks, *op. cit.* It should be noted that in some regions the Etowah and Savannah cultures precede the Lamar and show the beginnings of the Woodland-Mississippian synthesis that is carried to a conclusion in Lamar.

tion, correlated with the Tzakol phase of the Peten, has been disclosed at several places in Yucatan, particularly at Oxkintok. The architecture and ceramics of these Yucatecan Early Classic sites resemble those of the equivalent time horizon in the Peten but are regionally specialized. In the subsequent period in Yucatan, that corresponding to the Mayan Late Classic of the south, this Yucatecan specialization was even more pronounced, and a number of local architectural styles, such as Puuc, Chenes, and Maya Chichen were developed. The Yucatecan Late Classic period is believed to have lasted until about 1000 AD.[11] At least that is the usual date assigned to the beginning of the Toltec or Mexican period at Chichen Itza.

The archaeology of the Mexican period at Chichen testifies to a foreign and Mexican highland influence in no uncertain manner. Reliefs depict lines of warriors, jaguars, and eagles almost identical with those found at the traditional Toltec center of Tula in Hidalgo. Atlantean column and altar figures, feathered serpent balustrades and columns, colonnades, and Chacmol statues provide additional links to this same Tula complex. Much of the great building at Chichen dates from the Mexican period, including the famous ball court, the Castillo pyramid, and the Temple of the Warriors with its colonnade. Additions, dating from this period, were made on the old Maya Chichen style buildings, such as the Monjas, and in general the invaders introduced a number of new architectural practices. Outstanding among these was the increase in size of interior chambers by the use of columns instead of walls to support the weight of corbeled vaults. In connection with these technical changes Thompson makes the observation:

> There is . . . a possibility that this was not merely an architectural development, but a reflection of a different use of buildings resulting from new religious practices.[12]

In addition to architecture, further foreign evidences are seen at this time in Plumbate ware, Fine Orange (X-type) pottery, turquoise inlays, and metals. These are not necessarily Mexican highland or Tula items but are apparently derived from a number of Meso-American proveniences. Fine Orange ware, for example, is thought to be a Tabasco or Veracruz import, a region from which the Toltec influences might have come.

The identity of the invaders is debatable. Thompson is inclined to believe that the influx of Tula art into Chichen marks the traditional arrival of the Itza and that these Itza were not actually Toltecs but rather a Mexicanized Maya

11 See Thompson, 1945, for a summary of the culture history of the Yucatecan Maya.
12 *Op. cit.*, p. 14.

group from the west.[13] Tozzer, on the other hand, is now disinclined to associate the Itza traditional histories with the Chichen-Tula style of circa 1000 AD; and he is of the opinion that the migration to Yucatan was in general a direct one from the Tula site, not an indirect one via settlements in Veracruz and Tabasco.[14] The virtual identity of the Tula and Chichen reliefs supports the Tozzer position, but the absence of the characteristic Tula wares, Coyotlatelco or Mazapan pottery, argues against a direct migration. The Fine Orange type tends to strengthen the supposition that a Veracruz-Tabascan route is involved.

Whatever the ethnic forces behind the Toltec or Mexican settlement at Chichen, there is little question of it being a unique cultural expression, strikingly different from its Yucatecan background. As Pollock expressed it:

> Outside the immediate area of Chichen Itza, with the exception of a few traces—and those of questionable identification—there is not a single ruin, so far as we know, that exhibits architectural or sculptural remains that can be identified as like those of the type site or as being of this period.[15]

It would seem, then, that: (1) either all of Yucatan was deserted or a complete cultural sink during the Mexican period at Chichen; or (2) local cultures continued along old traditional lines. Pollock is inclined to favor the latter interpretation as the more likely of the two.[16] This would mean that a Puuc, or Puuc-like, culture was existing in other centers coexistent with the period of Toltec art and influence at Chichen.

The situation in Yucatan, following this interpretation, is not unlike that which we have described for Georgia. A strong alien culture establishes itself in a single site deep within a region held by another culture. In both instances there is evidence suggesting that the invaders did not accomplish this by wholly peaceful means. The Georgia site of the Macon Plateau culture was fortified;[17] the Chichen wall paintings and other art forms show one group of warriors (apparently Mexicans) battling and defeating another (apparently Mayas).[18] In each region there is also the apparent continuity of the local culture in other sites or localities; and this continuity seems to have lasted for a considerable time. A 200 or 300 year estimate has been made for the Macon Plateau period in Georgia and a 200 year or longer interval for Toltec Chichen Itza. The intrusive cultures,

13 *Op. cit.*, p. 12.

14 A. M. Tozzer, personal communication, 1953.

15 Pollock, 1952, p. 238.

16 R. E. Smith concurs in this opinion (personal communication, 1953).

17 Armillas, 1951, p. 84, describes a wall at Chichen Itza which he interprets as a defense work.

18 See Tozzer, 1930, and Wray, 1945.

in each case, are characterized by a public architecture and an art style significantly different from those previously in vogue in the recipient region. In Georgia, the new complex also brought with it a complete change in artifacts and ceramics; in Yucatan, the changes do not appear to be this deep or sweeping. Certain artifacts, materials, and pottery types do seem to be correlated with the Toltec art and architectural innovations; but a Yucatecan slate ware tradition, presumably of Chichen Maya and Puuc antecedents, carries on as the principal resident pottery.[19]

The period following Chichen Toltec or Chichen Mexican has been referred to as the period of "Mexican Absorption"[20] or of "Maya Resurgence."[21] Mayapan is the type site for this late culture, but elsewhere in Yucatan there occur architectural remains very similar to those of Mayapan. Pollock notes that the concepts of "resurgence" and "absorption" on the part of the Maya are based on ethnohistoric and linguistic evidence at the time of the Spanish conquest and upon the late period absence of sculptural art like that which flourished at Chichen in the preceding Toltec period. But he goes on to state, speaking of Yucatan as a whole:

> . . . the great preponderance of building remains assigned to this late period are not of Maya, but of so-called Mexican, style. Though the architecture differs from that of Chichen Itza of the preceding period, the style could well be a degeneration of those forms and is certainly more foreign than Maya.[22]

As with the initial diffusion by migration and the founding of the alien center, the resultant culture of the Yucatecan late period shows parallels to the similarly resultant Lamar culture of Georgia. Elements of the invading and recipient cultures have been blended and the same sort of selectivity in this combining is noted in both Yucatan and Georgia. For example, the public architecture of the invaders is retained in Mayapan culture as it was in Lamar. The Tula art style, as it is seen in late east coast sites of Yucatan, is greatly reduced, and this recalls the gradual dissolution of Southern Cult art in Lamar.[23] Late Yucatecan ceramics, as with Lamar, represent a strong carry-over of the local traditions.

19 This is the impression of both Pollock and R. E. Smith. Brainerd, who has studied Yucatecan pottery more intensively than anyone else, should clear up this important point in a forthcoming publication.

20 Thompson, *op. cit.*

21 Pollock, *op. cit.* Tozzer applies the term "Chichen III" to this period (Tozzer, personal communication, 1953).

22 Pollock, *op. cit.*, p. 240.

23 Southern Cult art in Georgia seems to climax at Etowah, in the northern part of that state, at a time after the beginning of the Macon Plateau period and just before the rise of Lamar (see Fairbanks, 1950).

NORTH COASTAL PERU

The oases valleys of the north Peruvian coast were the scenes of human habitation for at least three millennia before the beginning of the Christian era. In brief, north coast prehistory starts with the pre-maize horticulturists and fishers of Huaca Prieta and Cerro Prieto, undergoes a transition to the maize farmers of Coast Chavín times, passes through successive periods of mounting technological and agricultural development, and climaxes in the Classic Mochica culture somewhere in the latter half of the first millennium AD.[24] It is at this juncture that we are interested in the events of the sequence. Mochica (Early Chimu) culture is best known from the valleys of Chicama and Moche, but it extends north of Chicama to Pacasmayo, if not beyond, and south at least to the Santa Valley. It is likely that the Mochica realm was a multi-valley state under unified control. In any event, the whole region was linked by strong artistic and architectural bonds. The art was naturalistic and depicts life scenes of battles, rulers, prisoners, and other motives suggesting a national consciousness. Adobe pyramids, palaces, and fortifications were built, and irrigation was carried to great lengths with complex systems of canals and garden plots. Population concentrations in some places suggest numbers running into the thousands. In effect, we have in Mochica the beginnings of urban life and mature social, political, and religious systems. At a time estimated as 1000 AD the Mochica culture underwent a sudden and marked change. This same change is noted elsewhere in Peru, and the phenomenon has been referred to as the Tiahuanaco, or Coast Tiahuanaco, horizon. All of the Mochica territory except Pacasmayo and the far north was affected by this Coast Tiahuanaco influence.

The implantation of Coast Tiahuanaco culture on the north coast of Peru differs from the situations we have been discussing in Georgia and Yucatan in that the new elements were not concentrated in a single important site or zone with untouched cultural hinterlands surrounding this site. This difference in the diffusion may have resulted from the nature of the Peruvian coastal valleys which are relatively small and were, in the Classic and later periods, closely knit by the coördinated techniques of irrigation. Whatever the reasons, the Mochica valleys were, in effect, inundated *in toto* by this new cultural wave. Mochica pyramid mounds were used as burial places by the Coast Tiahuanacans; fortified sites were taken over; old cemeteries reused; and house sites reoccupied. The new impress

24 This is synopsized in Bennett and Bird, 1949. A detailed field excavational report covering this same developmental span is Strong and Evans, 1952. It should be noted that there are indications of an early lithic industry along the north Peruvian coast. Presumably these antedate the remains of the pre-maize horticulturists of Huaca Prieta (see Larco Hoyle, 1948, pp. 11-12).

is seen in ceramics, where form and decoration change radically, in textile designs, woodwork, metallurgy, and architecture. The architectural changes affected not only the buildings themselves but total settlement pattern. Whereas Mochica culture had laid great emphasis on the pyramidal mound built of small mold-made adobe bricks, the largest Coast Tiahuanaco constructions were huge rectangular enclosures in which the big outside walls were made of massive sections of poured tapia adobe. In the actual dwelling units, Mochica villages were clusters of rooms attached to each other in honey-comb fashion but usually without overall pattern or symmetry of arrangement. The Coast Tiahuanaco village, on the other hand, is often a rectangular compound with a symmetrical internal plan.[25]

The nature of society of the Coast Tiahuanaco horizon influence has been a matter of much speculation. The data on changes in physical type are suggestive in this regard but not conclusive. Newman[26] has noted a physical homogenization of the central and north coast populations in what are sometimes termed the "Late" periods. It is possible that this "leveling" of regional physical differences was the result of migrations and inter-breeding following in the wake of a Coast Tiahuanaco invasion; however, the "Late" periods date immediately after, rather than coexistent with, the Tiahuanacoid horizon style. The cultural evidences on this matter of actual invasion or stylistic diffusion are strongly suggestive. In the Virú Valley (a part of the Mochica domain) Ford[27] has demonstrated a ceramic continuity from early Chavín times up to the arrival of the Inca. In utilitarian pottery there is some degree of steady development throughout, but the most marked interruption is that which separates Mochica from Coast Tiahuanaco. As such, it is an argument for at least a partial population replacement. In the decorated pottery, much of which seems to have been made as mortuary goods, the severance of Mochica from Tiahuanacoid traditions is complete. It has been surmised that the sudden extinction of the art symbolism of an expanding militaristic nation could be accomplished only by force.[28] The totality of the evidence then, from physical anthropology, architecture, settlement plan, art, and common pottery, implies a social as well as cultural interruption. Whether this was an event of empire-building scope, such as the Inca carried out some centuries later, or a more local affair, remains unknown.

It is believed that the source of Coast Tiahuanaco art was in the central Andes

25 Willey, 1953.

26 Newman, 1948.

27 Ford, 1949. In the Virú sequence the names Huancaco and Tomaval are used, respectively, for Mochica and Coast Tiahuanaco.

28 Willey, 1948.

rather than the south Andean Tiahuanaco site proper. There are, of course, stylistic ties to the latter site from whence Uhle derived the name for the horizonal phenomena. Regardless of the point of origin of this style and/or conquest movement, there is little doubt but that the Coast Tiahuanaco culture pushed into the Mochica realm from the south, whether by coast or highland.

We have mentioned the differences between the blanketing effect of the Coast Tiahuanaco invasion of the north coast of Peru and the insular outposts of the prehistoric invasions into prehistoric Georgia and prehistoric Yucatan. There remains, however, certain parallel features in the Peruvian situation. With the movement of Coast Tiahuanaco culture from the south, the Mochica valleys were strongly affected as far north as Chicama. North of Chicama, the Tiahuanacoid elements, insofar as they can be measured in pottery form and design, are extremely weak.[29] The Mochica style is, however, well represented in the Pacasmayo (or Jequetepeque) Valley[30] and, possibly, in the Lambayeque Valley.[31] Thus these northernmost valleys represent a cultural hinterland beyond the frontiers of vigorous Tiahuanacoid influence. Significantly, it was in these far northern valleys that the Mochica plastic and sculptural tradition in pottery continued without serious disruption.

The Chimu civilization follows the Tiahuanaco period on the north coast. Chimu pottery styles are an interesting mixture of the old realistic modelling and plastic treatment of the Mochica plus certain vessel forms and decorative motives associated with Coast Tiahuanaco. The general impression, however, is that Chimu pottery has greater resemblance to Mochica than it does to Tiahuanaco. As an example, most of the Chimu grave ware is naturalistic and modelled and the stirrup-spout form is predominant, all traits of Mochica rather than Tiahuanaco derivation. The importance of the Pacasmayo and Lambayeque valleys in this fusion of two ceramic traditions should not be overlooked. These valleys were the localities in which the Mochica ideas were kept alive and which, later, fed them back to the valleys to the south once the full force of Coast Tiahuanaco had been spent. It is in this role that the function of the far northern valleys can be understood as being parallel to the hinterlands of the Georgian or Yucatecan situations.

In architecture the Chimu culture follows closely in the new forms and styles set down by Coast Tiahuanaco. The great rectangular adobe enclosures and the planned communities flourish. Chanchan, the Chimu capital, is the archetype of

29 Bennett, 1939, pp. 94 ff.
30 Doering, 1951.
31 Bennett, *op. cit.*

this kind of architecture and settlement arrangement. Parallels with Georgian Lamar and Yucatecan Mayapan cultures are obvious. The architecture, particularly the public architecture, of the invading culture seems to prevail in the resultant acculturation. In artistic symbolism Tiahuanacoid elements continue into Chimu, as we have noted, but there is a decrease in vitality as in the cases of Southern Cult art in Lamar or Tula-Toltec art in late Yucatan.

SYNTHESIS AND ANALYSIS

A pattern of diffusion and acculturation is evident in the foregoing comparisons. An active or aggressive culture invades the territory of a neighbor and succeeds in planting a colony within that territory, probably by force. This colony represents more than a transmission of ideas and manufactures. It is these carried by people who are fully indoctrinated in the invading culture. Such colonies may have been wholly foreign or they may have contained a mixture of both local and foreign population. In the latter case it is presumed that the intruders played the dominant role in the society. The innovations brought by the invaders may pertain to any or all cultural features, but public architecture and symbolic art seem to be emphasized. During this first period of contact, while the alien colonies are flourishing, the old cultural traditions are maintained with relatively little change in surrounding or nearby regions. In the succeeding period the effects of acculturation are seen in the appearance of a new culture. This new culture occupies not only the sites or colonies of the original invaders but the total region under examination. The new culture represents a blend of the intrusive elements and the old local forms.[32] The innovations in public architecture of the first period remain and are fully incorporated in the communities of the second period. The artistic symbols of the invaders also are retained but these have undergone modification and reduction. Certain artifacts, notably pottery, show a fusion of old and new elements with a tendency for the old to predominate.

This diagram recapitulates the events in three American prehistoric sequences, ignoring, at the same time, the certain differences in the configurations. It is in no way a "law" outlining an "internal necessity" in the course of these events. Undoubtedly, there are instances of "cultural colonization" from many places and times of the world's history where the results do not follow this pattern. It is easy to conceive of such a colonization "failing" by being "swamped" by the

32 These blendings were not accomplished *in vacuo*. In all three of the examples we have discussed it is evident that some cultural elements other than those of the invading and recipient cultures are present in the resultant acculturations. Undoubtedly, diffusion and contact from and with sources in addition to those under consideration continued during the period of acculturation.

recipient culture so that it leaves no appreciable trace in the subsequent record of cultural development. Or, as was the case with some of the European colonization of America, the invading culture might well "overwhelm" the recipient, replacing it in all of its aspects within a few decades or centuries. Rather than to stress further the "regularities" of the pattern which we have described it will be, perhaps, more fruitful to examine further the three historical cases of our discussion with respect to the particular conditions surrounding them. In this way we may gain some insight into the factors which permit or limit the type of diffusion-acculturation with which we are here concerned.

It will be recalled that in central Georgia the shift between Macon Plateau and Swift Creek was a major economic change. Swift Creek culture was based on hunting and gathering whereas Macon Plateau was primarily agricultural. This circumstance may explain some of the differences noted between the Georgia as opposed to the Yucatan and Peruvian cases. New tool types and new pottery (including the utilitarian ware) came into Georgia along with the Macon Plateau temple mound architecture and the Southern Cult symbolism. In Yucatan and Peru the new elements are primarily in the latter categories, those which are reflective of social, political, or religious changes rather than a basic economic readjustment. It may be significant in this regard that in both Peru and Yucatan the cultures involved were on a similar economic level of intensive agriculture. One basic fact emerges. The "cultural colonization" type of diffusion-acculturation appears to be possible between cultures of the same or of different subsistence levels.

In discussing the Peruvian situation we have already pointed to differences which set this case apart from the other two. Whereas the invading cultures on the Georgian and Yucatecan scenes were established in single localities surrounded by the older resident communities, the Tiahuanacoid culture of the Peruvian coast dominated a number of the Mochica valleys as a solid block, leaving as hinterland only the northernmost territories. Although natural terrain conformation and irrigation unity of the individual valleys may explain this pattern of invasion, it is possible that other, more strictly cultural, conditions were involved. We know, for instance, that warfare began along the north Peruvian coast well before the rise of the Mochica.[33] The idea is here advanced that invasion and conquest were not new institutions to the Mochica and that in the wake of a military conquest they would have submitted more readily to organized subjugation than either the Swift Creek or Classic Maya populations. It is obvious, of course,

33 Willey, 1953.

that the narrow valleys and the compact population centers of the Mochica would permit this sort of subjugation and control more easily than the forests and scattered settlements of Georgia and Yucatan. A condition which is highlighted by the variant setting and circumstances in Peru, but which binds all three examples together, is that a hinterland or "refuge" zone in which the invaded culture may retreat and maintain its integrity is a necessity for the subsequent acculturation following "cultural colonization." Judging from Yucatan and Georgia, the "refuge" zone may be larger, much larger, in fact, than the area occupied by the invading culture. On the other hand, in Peru the "refuge" zone was marginal and smaller than the invaded territory. The apparent importance of the "refuge" zone suggests that most of the amalgamation and blending of the two cultures takes place in the hinterland during the period that the invading culture maintains its colony. Some acculturation undoubtedly proceeds within the colony, but the vigor with which the "hybrid" cultures suddenly blossom upon the scene would indicate that they had been in formulation somewhere outside the principal establishments of the invaders.

There are other conditions which undoubtedly promote or hinder the "cultural colonization" processes although it is difficult to gauge the limits of some of these. One factor, certainly crucial, is that of a common cultural tradition—a participation in the same culture area or co-tradition. In all of the examples reviewed the two cultures participating in the contact belonged to such a common underlying tradition. Just what degree of cultural divergence marks the boundary beyond which acculturation deriving from "cultural colonization" cannot successfully take place is not known. There are indications, for example, that the European colonization of the eastern United States brought together two cultures which were so fundamentally incompatible that a successful fusion on anything like equal terms was impossible. In Mexico and Peru this incompatibility of European and native cultures was not so pronounced; nevertheless, the resultant mergers are dominated by the European elements.

Closely related to the condition of basic relationship within a common cultural tradition is that of the natural regions in which the cultures of any contact situation have been formed. Among our native American examples there are differences in the resultant acculturation which may be attributable, in part, to the relative degree of difference in the natural regions involved. As an example of this we note that the alluvial valleys of the Mississippi and its major tributaries—the environment in which Macon Plateau culture is presumed to have developed—do not differ greatly from the smaller valley bottoms of Georgia. In spite of a fundamental difference in subsistence economy between Swift Creek and Macon

Plateau, a stable adjustment was achieved in Lamar. Was this because the introduced trait of intensive maize agriculture was as practical in the Georgia valleys as it had been farther to the north and west? In contradistinction, the environmental difference between the Mexican highlands, the original home of the Tula-Toltec culture, and the Maya lowlands of Yucatan are much greater than any of those within the southeastern United States. Is the relative feebleness of the resultant Mayapan culture, with respect to what had gone before a measure of this difference?

CONCLUSIONS

Among the various types of diffusion and acculturation which occurred in prehistoric America there is one that may be termed "cultural colonization." The major processes involved are the implantation by persons, and probably by force, of an alien culture as a colony within the homeland of the recipient culture. Some cultural merging may take place within the colony, but the invading culture is clearly dominant in this limited sphere. Contemporaneously with the foreign occupation of the colony, the recipient culture continues within its old channels in adjacent hinterland, or "refuge," regions. During this period, acculturation of the recipient culture proceeds gradually in the "refuge" regions, apparently by borrowing, imitation, or other contact with the colony. Subsequently, a third culture arises from the "refuge" region as a more or less equal blend and acculturative end product of the contact of the invading and invaded cultures. The total region, both colony and "refuge" zone, are united by this new culture. This pattern of "cultural colonization" seems to have been achieved between cultures of similar or of different economic bases. Apparently, the success of the process of final acculturation is facilitated by the background of a common cultural tradition and by similar cultural-environmental adjustments of the merging cultures.

Bibliography

Armillas, Pedro
1951 *Mesoamerican Fortifications* (Antiquity, vol. 25, pp. 77-86).

Beals, Ralph
1953 "Acculturation" (in *Anthropology Today*, A. L. Kroeber, ed., pp. 621-641, Chicago).

Bennett, Wendell C.
1939 *Archaeology of the North Coast of Peru: an Account of Exploration in Virú and Lambayeque Valleys* (Anthropological Papers, American Museum of Natural History, vol. 37, pt. 1).

BENNETT, WENDELL C., AND J. B. BIRD
1949 *Andean Culture History* (Handbook, American Museum of Natural History, no. 15).

DOERING, H. UBBELOHDE
1951 "Ceramic Comparisons of Two North Coast Peruvian Valleys" (in *Selected Papers of the 29th International Congress of Americanists*, Sol Tax, ed., pt. 1, pp. 224-231, Chicago).

FAIRBANKS, CHARLES H.
1950 *A Preliminary Segregation of Etowah, Savannah, and Lamar* (American Antiquity, vol. 16, pp. 142-150).
1952 "Creek and Pre-Creek" (in *Archaeology of the Eastern United States*, J. B. Griffin, ed., pp. 285-300, Chicago)

FORD, JAMES A.
1949 *Cultural Dating of Prehistoric Sites in Virú Valley, Peru* (Anthropological Papers, American Museum of Natural History, vol. 43, pt. 1).

GRIFFIN, J. B.
1952 "Culture Periods in Eastern United States Archaeology" (in *Archaeology of the Eastern United States*, J. B. Griffin, ed., pp. 352-364, Chicago).

HERSKOVITS, MELVILLE
1948 *Man and His Works* (New York).

LARCO HOYLE, R.
1948 *Cronologia Arqueológica del Norte del Perú* (Trujillo, Peru).

LEWIS, T. M. N., AND MADELINE KNEBERG
1946 *Hiwassee Island* (Knoxville, Tennessee).

NEWMAN, M. T.
1948 "A Summary of the Racial History of the Peruvian Area" (in *A Reappraisal of Peruvian Archaeology*, W. C. Bennett, ed., Memoir, Society for American Archaeology, no. 4, pp. 16-19).

NEWMAN, M. T., AND C. E. SNOW
1942 "Preliminary Report on the Skeletal Material from Pickwick Basin, Alabama" (in *An Archeological Survey of the Pickwick Basin in the Adjacent Portions of the States of Alabama, Mississippi, and Tennessee*, by W. S. Webb and D. L. DeJarnette, Bulletin, Bureau of American Ethnology, no. 129, pp. 393-507).

POLLOCK, H. E. D.
1952 *Annual Report of the Director of the Department of Archaeology* (Yearbook, Carnegie Institution of Washington, no. 51, pp. 235-274).

SEARS, W. H.
1953 *Kolomoki Burial Mounds and the Weeden Island Mortuary Complex* (American Antiquity, vol. 18, pp. 223-239).

STRONG, W. D., AND CLIFFORD EVANS, JR.
1952 *Cultural Stratification in the Virú Valley, Northern Peru* (Columbia Studies in Archeology and Ethnology, Columbia University, vol. 4).

THOMPSON, J. E. S.
1945 *A Survey of the Northern Maya Area* (American Antiquity, vol. 11, pp. 1-24).

TOZZER, A. M.
1930 "Maya and Toltec Figures at Chichen Itza" (in *Proceedings of the 23rd International Congress of Americanists*, pp. 403-412, New York).

WEBB, W. S.
1938 *An Archeological Survey of the Norris Basin in Eastern Tennessee* (Bulletin, Bureau of American Ethnology, no. 118).

WILLEY, GORDON R.
1948 "Functional Analysis of 'Horizon Styles' in Peruvian Archaeology" (in *A Reappraisal of Peruvian Archaeology*, W. C. Bennett, ed., Memoir, Society for American Archaeology, no. 4, pp. 8-15).
1953 *Prehistoric Settlement Patterns in the Virú Valley, Perú* (Bulletin, Bureau of American Ethnology, no. 155).

WRAY, DONALD E.
1945 *Historical Significance of the Murals in the Temple of the Warriors* (American Antiquity, vol. 11, pp. 25-26).

PEABODY MUSEUM
HARVARD UNIVERSITY
CAMBRIDGE, MASSACHUSETTS

AUTHORITATIVE CONTROL AND THE SOCIETY SYSTEM IN JEMEZ PUEBLO

FLORENCE HAWLEY ELLIS

WITHIN THE CONFIGURATION of overall Pueblo culture, which carries such a large proportion of similarity wherever found, certain traits of social organization which differentiate Eastern from Western pueblos[1] have been pointed out. Looking beyond the forms to the principles upon which they rest, we find three basic concepts in which the two groups show contrast. These are: (1) emphasis upon the unilateral family line (lineage) of the West[2] vs. the bilateral family with informal leadership from any individual embodying such personal ability in the East; (2) relative emphasis upon peace in the West (except in Zuñi) vs. war interests in the East,[3] (3) a loose socio-political control in the West vs. a tight and very authoritative control in the East. Although degrees of difference in these traits are observable, even within a single linguistic group, the concepts are so deeply involved in the culture picture that they suggest very old and probably pre-Pueblo biases of tribes which already carried a cultural background of their own when they borrowed the idea of a sedentary agricultural existence and something of the religious complex which no doubt traveled with it. The purpose of this paper is to point up the first and third principles, especially, as seen in the Towa pueblo of Jemez and to suggest some points in historical reconstruction dependent upon these data.

The system of authority and government in Jemez is based in a religious hierarchy, as elsewhere in the Pueblo area, but the pattern shows exceptionally tight unification. This may be in part the considered method devised to weld into one strong unit the many villages and societies of which we know modern Jemez to be composed. Or it may be merely the "Towa system," outgrowth of historical

1 The Western Pueblos, culturally, usually are considered to be Hopi, Zuñi, and the Western Keres. To these, at least for discussion of fundamentals, I would add the Eastern Keresans, which show a basis of western social organization and are presumed to have come out of the west during P III or IV periods. This leaves as the Eastern Group, the Tanoan pueblos: the speakers of Tiwa, Tewa, Towa, and—formerly—Tano and Piro. The Hopi-Tewa left New Mexico for Arizona about 1700.

2 Fred Eggan, *Social Organization of the Western Pueblos* (Chicago, 1950); Florence H. Ellis, *Pueblo Social Organization and Southwestern Archaeology* (American Antiquity, vol. 17, pp. 148-151, 1951).

3 Florence H. Ellis, *Patterns of Aggression and the War Cult in Southwestern Pueblos* (Southwestern Journal of Anthropology, vol. 7, pp. 177-201, 1951).

precedent; no other Towa pueblo exists today with which to make comparisons and the original Pecos organization is too little known to offer hints.

Jemez structure may be summarized as based upon a number of religious societies—each headed by a group of twelve main men or priests, the active members—and two general war or men's societies, the Eagle and the Arrow, to one or the other of which all the village men belong. The latter (as discussed in detail elsewhere) are the counterpart of the Tewa moieties. Membership is patrilineal although if there are two or more sons in a family they may divide in war society affiliation. Most of the religious societies have associate members, but the Underchiefs (Underworld Chiefs) society consists of but its twelve top men, and the society as such is considered to comprise the leading order of the Arrow society. One of the Underchiefs—but not the leader of that society—must be the leader of the Arrow society. Similarly, the twelve leading men for the Eagle society consist of the twelve active members of the Jemez Eagle Catchers society, and the leader of the Eagle group must be one of the Eagle Catchers, though not its leader. Underchiefs and Jemez Eagle Catchers thus are approximately parallel to, but not duplicates of, the Tewa moiety societies.

Membership in the lesser orders of the religious societies may come through having been cured, desiring to join, or trespassing too close to where a society is performing a ceremony. Initiation of such members is done in the society's own chamber or the house of its leader.[4] Membership in the group of twelve active members, the leading "order" of each society, depends upon being selected by the village religious council.

The Jemez pattern, lacking seasonal dichotomy of religious and governmental duties, perhaps is closer to that of the Tiwa than to that of Tewa relatives, but contrasts with both in what might be called a close circular organization.

Jemez control is in the hands of a supreme council[5] known as the "Fathers," composed of the leaders of all the religious societies. Among these leaders the two most important are the Cacique and the War Priest, head of the Cacique society and of the (formerly existent) Opi Scalp group, respectively. These two men

4 Joining a society for personal reasons is very expensive. The new member must provide approximately 150 lbs of corn meal for each of the twelve medicine men, as well as feeding the entire pueblo during the time all the people are helping to provide this payment. One woman from each family of the village usually offers to cook or grind corn. Men bring wood; children carry water. If a poor person needs to join a society to be cured, the entire pueblo may aid in making the necessary contributions of corn to be ground for the medicine men.

5 Jemez has three councils: the supreme council composed of heads of all the religious societies, the secular council composed of governors and ex-governors, and the general council composed of the two other councils meeting together to consider special problems.

wield more power in the pueblo than any of the other society heads, the War Priest taking the most active part in village affairs, both religious and secular, and the Cacique spending more time in the retirement necessary to his "good heart" and the prayerful consideration of his people. That these men should function with aid of the religious council is common to the Rio Grande pueblos, but that the members of the supreme council—religious society leaders—all should be selected by the council itself rather than by members of those individual societies is an innovation as peculiar as selection of all the top twelve men of each society by the same general council.

Such selection is made approximately every ten years, the discussion of possible appointees being started some two years beforehand so that qualifications may be carefully considered. The Cacique and leaders of the rain societies must come from specific clans and, to be acceptable individuals, should have reputations of dependability, conservative concern for village interests, and a background of combined native and Catholic religion. A person's position as society leader and equally as one of the top twelve members is for life. During the period since the last installation ceremony many will have died and their places been taken, but only in temporary function, by left- or, at the demise of left- , by right-hand assistants. But these assistants do not necessarily succeed to actual office; indeed if neither they nor any other present member of the society chance to be of the clan and qualities required for office, the "Fathers" may decide that someone not even previously a member of the society is to become its head. Debates concerning candidates are long and arduous: lack of agreement may lead to an official request that some parent dedicate a young or even an unborn child (should it be male) to the position of officership in that society.

But never, until the hour of installation, is the proposed officer, or person to become a leading member, given any inkling of his selection. Instead, his father, ceremonial father, or other type of "guardian" is "consulted" concerning the matter, a reflection of the pueblo principle of gerontocracy in which the older members of a family carry primary authority to their death bed. This "consultation," however, actually is a notification. The War Chief's announcement that a man has been selected for office and that the "Fathers" desire his father's permission to proceed with the appointment is tantamount to an order to give such permission. The father may realize only too well the deprivations of time and energy which must ensue from the responsibilities of that office: he may argue—both for modest propriety and because he would save his son the necessary personal sacrifice—that the selectee does not have the high character necessary, etc.

But even though he may weep openly, there is no recourse: in the end the father can but voice consent.

This system of drafting men for office as society leaders has little to do with the desires of the society as such: the society must accept as its leader someone chosen for it by the leaders of the other groups because the latter feel that the person will work well with them in their handling of village problems. Other needed members are "put in" on the basis of their being men who will benefit the pueblo in whatever special functions are carried by that society, such as inducing fertility, bringing rain, keeping the seasons progressing in order, curing, fumigating from witchcraft, etc. Old stories tell of some societies having been suspected of using their "power" only to their own ends so that they excelled in hunting or other pursuits. They were accused of the crime of witchcraft and either punished or exterminated.[6] Individuals who appeared to have better fortunes or possessions than others of the community similarly were punished by destruction of such property or by the warnings of officers and enmity of neighbors. The one opening for the individual to gain position and prestige was through—and for—the group, in spite of the pronounced pattern of individual ownership and of family rather than group responsibilities in production and distribution of economic goods—after the ceremonies requisite to production of both plants and animals had been attended to by and for the group. This background of "holistic" thinking is clearly symbolized in the kiva ceremony given to place the new officers and leading men of the main order of each religious society into position.

All the men of the village (society members or not) are summoned to the kiva by the town crier, who announces merely that important matters are to be discussed. Everyone seats himself at random, and absentees are searched out and may be subjected to heavy fines for not having heeded the initial call—which is an order. At the opening of the meeting, boys known to have been stealing or men caught in drunkenness may be pulled into a vacant place in the center, so that all will think the business is that of dealing with their crimes. Otherwise men who suspect that they might be candidates for society positions might run away, it is said.

But, almost at once, the men are told to take their proper places; at which, members of the main order of each religious society move toward the center front, where as many parallel lines as there are societies have been marked by sets of twelve "sun symbols" (*wagi:* one's place). The six-inch circle and four extending rays of each, representing spirit roads from the four directions, are of cornmeal.

6 Ellis, *Patterns of Aggression and the War Cult.*

Every member stands upon his own "sun symbol"; those of members who have died remain vacant. The position for the leader of each society is in the center of his group, upon the line of corn meal which has been drawn from the fireplace through the center of the floor to the altar. This and two similar lines drawn in outward curves from the ladder base at the entrance to the altar are paths on which spirits supposedly enter.

The Tabush (Keresan: Koshare) are seated in a row at the front (the end opposite the fireplace and ladder), and in their center is the Cacique flanked by his left- and right-hand assistants. The War Priest or the Snake Priest and the Tabush men now begin to arrange a floor altar with a bowl of sacred water and one of sacred corn meal—the first hint to the new men that this meeting has been called for installation of the new officers and replacement of leading men of these religious societies. People become solemn and quiet. The War Priest—or the Snake Priest[7] if the former is missing and to be replaced—is in charge. He and the two assistants to the War Priest (not War Captains, who are secular officers), representing the Elder and the Younger of the Twin War Gods, are in ceremonial dress; each assistant carries a pair of eagle wing feathers bound together at the base, as for all ceremonial usage, and each keeps a pebble in his mouth to remind him never to speak.[8]

After some opening ceremonies, these two men move about among the people seeking the men whose names they have been given. "Elder Brother" covers the right side of the room and "Younger Brother" the left; both move about erratically so that no one will guess the candidate sought until finally one of the messengers whirls about to stop in front of him and holds out the tips of the eagle feathers.

This is a shock to the candidate and usually not a happy one. He is taken aback; he may cry "like a baby." He protests; he explains that he is not worthy and—more realistically—that he is too poor and can not afford time from his work for the responsibilities of office. Protestations indicating modesty are considered proper, but neither they nor the actual pressure of an individual's private affairs are permitted to sway the decision of selection: the man is told by the War Priest that he has been chosen and must take the position. The assistants stand in front of him until he finally grasps the tip of the eagle feathers in his

7 In the Hopi pueblo of Shungopovi, the War and Snake societies are identical, an idea Jemez apparently borrowed. The importance of the Jemez Snake group has been on the increase. See E. C. Parsons, *Hopi and Zuñi Ceremonialism* (Memoirs, American Anthropological Association, no. 39, 1933), p. 101.

8 Representatives of supernaturals never speak.

hand and thus is led to the floor altar, where he takes a pinch of corn meal from the bowl, sprinkles it upon the altar, and is led back to his specific place in the line occupied by the society into which he has just been inducted.

Initiation and installation are handled by the two war societies, Eagle and Arrow, with a four-day ceremony apiece. The first night is dedicated to installation, an all-night ceremony. The following day, referred to as the "first day," is used in preparation for initiation. Public whipping and private initiation ceremonies take up the second and third days. The fourth is used in preparation for a public dance to be given the following day in the plaza.

When the members assemble in the kiva on the first night, they seat themselves in groups between the pilasters, each group of men having its own design for body painting. The log pilasters (roof supports) rise from the bench built against the wall around the half of the room farthest from the ladders and fireplace, and from the floor itself in the other half: men lean against bench or wall but do not sit upon the bench. Each man has his own life-time position represented by a "sun symbol"; those left vacant are of members who have died and now are to be replaced. The men on the right[9] side of the kiva are thought of as "Elder Brother" and represented by an eagle feather; those on the left as "Younger Brother" and represented by the feather of a hawk. The terms refer to the representation of katcinas by the men, who are thought to come in pairs, one older and one younger, for each type. The paired katcinas show a few slight differences intended to identify the superior and the subordinate position. When the Tabush speak to a katcina it always is to the Elder Brother because he carries the authority.

Officer installation takes until about 3 AM, when the two lines, one of men taken in since the last big ceremony and one of uninitiated boys, waiting outside the kiva, are admitted to participate in the ritual of filling the open places in the ranks of main members. When the newcomers enter the kiva, they take their places in two groups, one on either side of the center. Those along the outer edges of these groups are asked to form a single file and to hold their folded arms close against the sides of their heads. A man, painted but not masked (although he appears to represent a whipping katcina) comes in carrying a rope and a whip of yucca blades. He is accompanied by an assistant. The whipper walks about seeking each of the men whose names have been given him; if he forgets one the assistant reminds him in a whisper. When the whipper spots the man he is looking for, he makes a dash toward some other person to throw the first off guard—and

9 Right or left as seen when one faces the room from the base of the entrance ladder.

then back to the selected man and tosses the lasso over his head as one would rope cattle. The candidate struggles, manages to untangle himself, and runs, while the whipper pursues and beats him with the yucca blades. The dash of the candidate always is toward the area directly behind the ladder, from which those who customarily sit there have moved out for the occasion. After gaining this retreat the candidate is not further whipped. The whipper, returning to the central area to seek other candidates, remains in constant motion so that no one suspects when he is going to rope another man. When he has all the required men behind the ladder, he makes the motion of blessing for everyone by moving his arms slowly back and forth, horizontally, and leaves.

Then his assistant, carrying a pair of eagle wing feathers like those previously described, goes to the floor altar of the society, dips the feather tips into the bowl of sacred water, and sprinkles drops in the six cardinal directions. Returning to the men behind the ladder, he offers the feather tips to the man first roped and leads him up to the altar and then to the vacant place, marked by a "sun symbol," which is to be his position for the remainder of his life. Speaking to the men of that section, the assistant introduces the newcomer: "Fathers, I come to bring you a new son whom I hope you will accept." They answer, "He is well accepted; take a seat, son." One of the group makes him a cornhusk ceremonial cigaret.

In giving it to him, the maker first waves it to the fire and then overhead, symbolizing the offering of smoke to the supernaturals. The recipient, taking it, says, "May you have good luck in deer hunting," or "May the gods hear our prayers," and the answer is "Yes, may we be heard." The new man then gives a light to the others in the group, in each case using as a coal the smoldering end of a sunflower stalk or a dry corn cob. The act of smoking together, with prayer, represents an offering to the supernaturals. This little ceremony is repeated for each new member, after which he is painted with the design which is proper to his section. Later there will be public whippings of the new officers.

That the pueblo city state took its responsibilities to its citizens with seriousness is not new to anthropologists, but nowhere have the reins of control been so tightly drawn. Society heads commonly form a council which aids the Cacique in administrative matters, but a leader customarily takes office on the basis of having been a member longer than anyone else, the assistant leader carrying the next longest record of membership and succeeding the leader at his demise. Jemez does not leave to such chance the position of society head, which at the same time is the much more important position of membership in the governing council. Although definitely geared to the concept of the benefit of all, the state

is anything but democratic: leaders are selected by other leaders and withdrawal from duty or refusal of it is not permitted. This close and apparently efficient control may be an outgrowth of the distinct tendencies of Jemez toward warfare, another trait in which they seem to have surpassed all of the other pueblos. According to tradition, much of the early fighting was against other villages, each of which existed as a single religious society toward which Jemez felt grievance. Conquest meant amalgamation of that society into the Jemez complex. Acceptance of other groups who joined Jemez by desire meant similar amalgamation of their societies, according to reiterated Jemez statement, because the unification principle of these peoples was that of traveling with—or "living at the stopping place of"—the fetish of their society.

This concept of the society rather than of the lineage group as the basic unit may be the explanation of more than one lineage in some pueblo "clans" which carry a ceremonial complex centering around certain fetishes and religious paraphernalia of great symbolic importance to the members. When the Isleta Corn groups, usually considered as "clan" (matrilineal but not exogamous), recently lost their "clan" fetishes through robbery of the ceremonial house in which they all were stored, the laments of the old people indicated that they felt they had thereby lost all degree of security. Their fear of unknown possibilities was pitiful. One might say that although they were still in their own houses, on familiar ground, their position was felt to have become—all at once—that of "displaced persons," without psychological homeland or protection.

We note that in some of the older anthropological papers "clan" lists appear much larger than those of today; reading these shows that societies and clans all were lumped together by the informant who provided the data, the native generic term for both clan and society merely meaning "people." Hypothetical reconstruction would picture one, or a few, families tying themselves together on the basis of devotion to—and the resultant protection of—a fetish. One can imagine with equal ease the development of the concept that responsibility for (possession of) the cult objects should forever rest in the lineage which originally "received" (discovered, borrowed, or created) them, or that, on the other hand, the leader responsible for the cult objects and their ceremonies should be the oldest man in the group. Those to whom the first principle would seem the "natural system" would be people who already had made the lineage important in their culture; those to whom the second system might occur would be those more impressed with the general concept of gerontocracy and, probably, of the bilateral extended family. In neither case would members of the cult group necessarily be relatives, although throughout the Pueblo area we find that members of

a family are likely to have "gone into" the same society, even as membership in the Presbyterian Church, the Republican Party, or the Masons shows a tendency to run in our own family lines. That two or more lineages which felt themselves closely tied to a fetish and its cult should call each other by relationship terms and forbid intermarriage would be an easy development. And that such a "clan" group later might join with other groups into a larger village pattern and permit outsiders to join the cult, and to marry members of the original "clan" seems equally conceivable. In the past, most of our accounts of amalgamation of small groups into villages of some size has come from the Western Pueblos and dealt with "clan" movements, but the incoming clan always seems to have contributed some new cult to those of the host village. On the basis of present knowledge we might suspect that some of these moving groups actually were clans and some—instead—cult societies accepted as clans if the host group thought in terms of clanship and stressed clan exogamy in marriage control. For Jemez, legend is consistent in picturing a situation of amalgamating societies, not clans; and general Tanoan tendencies to stress the bilateral family and relative age of individuals within a category, as seen in the kinship system and corroborated by ceremonial usage, suggests it to have been a principle among the other Tiwa, Tewa, and Towa peoples as well.

The Jemez system of controlling the amalgamating societies—whether conquered or joining by choice—through placing their officers in the large ruling body of "Fathers" provided security for the entire pueblo; and selection of the officers for each society by the others offered some insurance of coöperation and minimized chances of sabotage and treason. It also provided the newcomers with a feeling of importance, of "belonging." The importance of the War Priest as a general executive and official "always on guard, wherever he was" was a part of the tight system of centralized control; he remains important today, one of his functions being a strong stand against inroads of Protestantism. Zuñi is the only other pueblo in which the War Priest (Pekwin,[10] not to be confused with the Bow Priests) is yet known to have stood out as the main leader, but throughout the Tanoan pueblos we have evidence that his position was at least as high and perhaps higher than that of the Cacique.

Superficially, the Jemez council of "Fathers" might appear similar to what sometimes is spoken of as the Hopi "council" consisting of heads of the religious societies. Actually the two are in complete contrast to each other. The strong Jemez council with its close control of members carefully selected for personal

10 Ellis, *Patterns of Aggression and the War Cult.*

qualities of leadership is at the opposite pole from the informal unorganized Hopi group, the men of which occupy positions as priests primarily through membership in a certain lineage and actually exerting little control over the village.

The contrasts between Eastern and Western Pueblos are largely below the surface.

University of New Mexico
Albuquerque, New Mexico

NORTHEAST ASIAN AND ALASKAN POTTERY RELATIONSHIPS

WENDELL OSWALT

A RELATIONSHIP between recent Eskimo pottery of the Bristol Bay-Norton Sound region of Alaska and certain Kurilian-Kamchatkan wares was originally advocated by de Laguna[1] and has been recently supported with additional evidence by the writer.[2] It is now apparent, as it was suggestive to de Laguna, that the relationship is more far reaching than first had been proposed since a similar type of ware has been reported in Japan as well. The decorative styles, their chronology and distribution will be considered herein with particular emphasis upon the similarities between some characteristic methods of surface treatment found in Japan and Alaska which may or may not have been reported from the Kurile Islands or Kamchatka.[3]

First to be considered is the Alaskan pottery with a counterpart in eastern Asia. Nearly all such Alaskan ware is found in the Bristol Bay-Norton Sound region and the adjacent inland areas along the Yukon and Kuskokwim rivers. This distinctive pottery is typified by cooking pots with flat-bottoms and flaring sides that constrict slightly at the neck and then flare again at the rim or, in other words, the "situla shape." Accompanying the above vessel form are the following types of surface treatment: (1) from one to seven horizontal incised parallel lines encircling the vessel rim, (2) a combination of horizontal and short vertical lines, (3) horizontal series of dots near the vessel rim, (4) split dots accompanied by line motifs, (5) combinations of lines and dots, (6) zigzag lines made with the scalloped edge of a sea shell (*Clinocardium nuttallii*), (7) short striations made with the back of a shell, (8) triangular depressions made with the scalloped edge of a shell, (9) vessel rim knobs, (10) ridges and grooves inside the vessel, outside the vessel, or both inside and outside, (11) line or mat impressed vessel bottoms.

In Alaska situla-shaped vessels decorated in the above manner are best known from two localities. The first is the lower Yukon River Eskimo and Indian sites investigated by de Laguna,[4] where situla-shaped pots having horizontal lines, horizontal and short vertical lines used together, lines and dots, split dots, ridges

1 De Laguna, 1947, pp. 235-245.

2 Oswalt, 1952a, pp. 18-28.

3 Time for this study was made available by Dr Ivar Skarland of the University of Alaska while the writer was on the University Museum staff. The writer also wishes gratefully to acknowledge the criticism of this paper by Dr James B. Griffin.

4 De Laguna, 1947.

and grooves, and rim knobs were found. The same general complex with some important additions is present in the Hooper Bay Village site[5] on the Bering Sea coast between the Yukon and Kuskokwim river mouths. Here the situla shape was decorated with horizontal lines, dots alone, lines and dots, split dots, ridges and grooves, rim knobs, the shell-made zigzag line, shell-made triangular depressions, and a series of short shell-made striations. Line-dot decorated sherds are also reported from the Bristol Bay region,[6] St Michael,[7] in the upper levels at the Nukleet site on Cape Denbigh,[8] occasionally on Seward Peninsula,[9] and inland near the headwaters of the Kuskokwim River at Lake Telaida in Athabaskan Indian territory.[10]

EASTERN ASIAN COMPARATIVE WARES

Similar ceramic styles have been reported from Kamchatka, the Kurile Islands, and northern Japan. The parallels will be considered along with their chronological implications. Jochelson[11] illustrates three distinctive pottery types from the various sites in Kamchatka. One is a flat-bottomed vessel with evenly flaring sides and suspension lugs inside the vessel rim as well as ridges and grooves just inside the rim. A second type of ware has outside rim ridges and grooves that are clearly made by applying strips of clay to the already moulded vessel; the decoration on the first type may have been applied in the same manner. The third form of pottery, from the Kulki and Kavran river sites in western Kamchatka, is decorated with horizontal incised lines, dots, lines and dots, horizontal and short vertical lines used together, zigzag lines, and vessel ridges and grooves. One illustrated sherd[12] appears to have triangular shell-made (?) depressions similar to the Hooper Bay Village example.[13] Another design element which should be considered is short zigzags near the rim and usually at right angles to a horizontal zigzagged line. Some of this ware is also cord-impressed. The sherds from the Kulki and Kavran river sites are so small that no vessel reconstruction is possible.

The Kamchatkan pottery described by Schnell[14] is of three forms: pots with inside ears, those with four or five ridges and grooves around the rim, and a finer

5 Oswalt, 1952a.
6 De Laguna, 1947, p. 228; Larsen, 1950, p. 180.
7 Oswalt, 1952a, p. 28.
8 University of Alaska collection.
9 Oswalt, 1953.
10 University of Alaska collection excavated by Miss Charlene Craft.
11 Jochelson, 1928.
12 *Idem*, pl. 19, A.
13 Oswalt, 1952a, fig. 8, 8.
14 Schnell, 1932.

ware which is line-dot decorated and occasionally cord or basket-impressed. These three types correspond to the forms described by Jochelson. Schnell considers all the pottery types described by himself and Jochelson as being contemporaneous and having a terminal date near the end of the 17th century at the time of Russian contact. Jochelson reported that he had found 11th century Japanese coins at a Kurile Lake site but this dating is open to question. Baba[15] considers these as being Kan-ei-tsū-hō coins which were not circulated until after 1636. This type of coin was found by Baba in a Kurile Island site where the associated pottery was the form with ears inside the vessel. The same coin was again found by Baba on Shuma-ush Island in the Kuriles; this time associated with a Russian coin minted in 1842![16] It would appear that the identification by Jochelson is incorrect; unfortunately it has been often quoted as an early date for the Kamchatkan material. Quimby,[17] summarizing Kamchatkan pottery developments, considers two regional types, a southern and a northwestern. The Kulki and Kavran river sites belong to the northwestern group which "may be ancestral to the Koryak culture and is oriented towards Siberian culture in general."

The pottery collection from the Kurile Islands is rather small, rendering comparisons difficult. Schnell[18] describes three types from the region: smooth, cord-impressed, and textile-impressed wares. It is the first type that is of interest to us in this comparison. The pots are situla- or flower-pot-shaped; they are decorated with strips of clay, incised or stamped lines and dots, and with an occasional rim knob on only the flower-pot style. Mention should also be made of a cord-impressed flat base that is found among the textile decorated ware. Schnell[19] considers textile-impressed ware as being the oldest type and related to the textile pottery of Japan. The smooth style is thought to be the most recent, with cord-marked ware falling chronologically between the two. It is difficult to compare the Kurilian pottery with that of Japan, Kamchatka, and Alaska since the Kurilian collection is limited and appears to include vessels of various periods. Schnell considers the smooth ware, which most readily compares with Alaskan pottery, as being related to Yayoi ware of Hokkaido.[20]

The next ware to be compared is the earliest of Japanese pottery from the

15 Baba, 1939.

16 The writer was not aware of the reference by Baba to these coins until it was kindly pointed out by Mr Tatsuo Sato of the University of Tokyo.

17 Quimby, 1947, pp. 178-179.

18 Schnell, 1932, pp. 54-58.

19 *Idem*, pp. 57-58.

20 *Idem*, p. 58.

Proto-Jomon period on the northern islands of Honshu and Hokkaido.[21] Proto-Jomon ware may be divided into three types, which are best defined in the ware from the Kwanto Plain region around Tokyo on the island of Honshu. The types, based upon decoration type, are carved-stick-impressed, fiber-impressed, and shell-impressed. All the decorative styles are on funnel-shaped vessels with pointed or rounded bottoms. The shell-impressed ware, which is of interest in our comparison, may be divided into two types, Tado I and Mito. The former is decorated with incised parallel lines, plain dots, split dots, shell-made zigzags, and shell-made striations; a few sherds are carved-stick-impressed in addition. The Mito type is decoratively defined by many incised parallel lines but rarely contains stick- or shell-impressed specimens. The Sumiyoshi site in the Tado I and Mito tradition is significant since it contains no carved-stick or fiber-impressed wares and parallel incised lines are uncommon; most of the sherds are decorated with some sort of shell-made pattern. The illustrated sherds of this period[22] have the line-dot motif, large zigzagged lines (not shell-made), horizontal lines with short vertical lines at right angles to them, rim knobs, short zigzagged designs, a double lined incised $\times$ design and very short shell-made zigzags at right angles to the vessel rim.

The succeeding pottery style of northern Japan, as presented by Groot,[23] is the Later Proto-Jomon ware. In the Kwanto Plain area, where it is most clearly defined, the pottery is divided into three types: Tado II, Shiboguchi, and Kayama. The Tado II is a continuation of Tado I with the addition of flat-bottomed vessels. The Shiboguchi pottery[24] is described as being funnel-shaped or "with a slight outward curve of the body toward the rim, a somewhat indented neck, and a slightly expanded rim." The bases of these pots are usually pointed, although occasionally they are flat. Here for the first time in Japanese pottery the situla-shaped vessel appears. The ware is shell-striated on the inner and outer surfaces and is decorated near the rim with encircling ribbons of clay, punctates, parallel incised lines, and shell impressions. Some of the illustrated sherds[25] also have dotted and diagonally lined rim lips.

The Kayama ware is more similar to Early Jomon pottery (which follows Proto-Jomon) than to the Shiboguchi ware.[26] Kayama ware is funnel- or situla-shaped with rims that are usually flat but sometimes castellated. "Of the 493

21 Groot, 1951.
22 *Idem*, pl. IX.
23 *Idem*, pp. 32-35.
24 *Idem*, p. 32.
25 *Idem*, pl. XI
26 *Idem*, pp. 32-33.

SHERDS FROM HOOPER BAY VILLAGE, ALASKA, WITH FORMS OF SURFACE TREATMENT SIMILAR TO NORTHEAST ASIAN WARES

1, 2, shell-made striations; 3, shell-made zigzags; 4, lines and dots; 5, shell-made triangular depressions; 6, lines and series of split dots; 7, lines and dots, dots alone and a rim knob.

sherds found at the Kayama site, 311 bore decoration . . . and 182 showed only the streaks made by rubbing with the Anadara shell." This ware shows a marked developmental trend towards later elaborate Japanese pottery forms. The sherds are decorated with more elaborate raised ribbons, spirals, and zones of decoration. Pottery from different Kayama sites varies somewhat in shape and decoration; most of the ware is shell-streaked although a few sherds are cord-impressed.

It is important to note that early Japanese pottery styles persisted until a late period even in Japan proper. (This is particularly significant since the comparable Alaskan ware is late and the Kurilian-Kamchatkan wares are probably so.) In this regard Groot[27] states,

> It is an interesting fact that throughout the Jomon Period the pottery found in the Tempaku valley retained many of the features of the Sobata ware [a Kayama style found near Nagoya], that is, the shell streaks on the surface, the flat bases, the coarseness of the texture and the color. The beautiful ware of the Middle- and Later-Jomon Period is entirely lacking.

By the time of the Early Jomon period most of the unsophisticated decorative motifs are replaced by cord-impressed ware with rhomboidal patterns, zones of decoration, the herring bone design, spirals, and raised ribbons, to mention a few of the more important elements. Groot[28] summarizes Early Jomon pottery by saying,

> as a whole [it] was influenced greatly by the cultures of North and South Siberia, although basically it developed out of the localized cultures of the Proto-Jomon Period in Japan.

The succeeding Jomon period of the Moroiso culture diverges still more from earlier wares. The decoration consists of cord-impressions, nail-shaped designs, patterns of spirals, triangles, and geometric figures; shell-impressed ware generally becomes less important after this period. The Proto-Jomon ware, which is the earliest pottery from Japan, would date, according to Groot,[29] about 3000 BC. However, an important point in our study is that some Late Proto-Jomon pottery persisted relatively unchanged down to the Yayoi or Bronze Age and similarly the Sumyoshi (Proto-Jomon) stone work persisted unchanged in northern Japan throughout the Jomon period.[30]

---

27 *Idem*, p. 34.
28 *Idem*, p. 42.
29 *Idem*, p. 85.
30 *Idem*, pp. 31, 70.

ALASKAN POTTERY IN GENERAL

In Alaska the chronology of the situla-shaped pot with its characteristic forms of decoration is rather well delineated, and it has a distribution primarily confined to the Bristol Bay-Norton Sound area, as indicated at the beginning of this paper. This shape is not associated with older decorated forms of Alaskan pottery, nor is there any logical Alaskan base from which it could have been derived. In order to clarify the chronological position of this ware it is necessary to sketch briefly earlier Alaskan pottery developments.

The oldest known Alaskan pottery is either plain, check-stamped or linear-stamped, with both decorative forms being applied with a paddle. These types occur in the Old Bering Sea phase on St Lawrence Island where the check-stamped decoration occurs only rarely;[31] at the Iyatayet site on Cape Denbigh there are linear-stamped, check-stamped and also a few cord-marked sherds,[32] and in Bristol Bay Ipiutak-related sites[33] are found a check-stamped and a cord-marked ware. The vessel shape associated with these designs is usually the conical bottom and rarely a flat-bottom. At the Iyatayet site flat and concave, as well as rounded, bottoms are found; flat-bottomed vessels were reported from the Bristol Bay Ipiutak-related phases as well. Check-stamped ware (usually with large checks) has survived locally down to historic times at Deering on the north side of Seward Peninsula[34] and on Nunivak Island.[35] Striated pottery does not appear again until the late prehistoric period when it is found at the Hooper Bay Village site and at Platinum South Spit, in Kuskokwim Bay.[36] As previously pointed out[37] there are numerous methods of applying striations so that a somewhat different end result occurs; the shell-striated sherds from Hooper Bay Village and the same type from Platinum South Spit (in the University of Alaska Collections is a striated sherd from Good News Bay which is identical with Hooper Bay Village Shell Striated ware) are quite different from the Old Bering Sea and Iyatayet paddle-impressed specimens even though both are striated. The two styles are from different pottery traditions.

Another important pottery design on older Alaskan ware is the concentric circle or spiral motif applied with a paddle, primarily on conical bottomed pots.

31 Collins, 1937, pp. 166-169; Geist and Rainey, 1936, p. 223; Rainey, 1940, p. 550.
32 Griffin, 1953, pp. 40-42.
33 Larsen, 1950, pp. 177-186.
34 Oswalt, 1952a, p. 28.
35 Verbal communication from James Van Stone.
36 Larsen, 1950, p. 180.
37 Oswalt, 1952a, p. 24.

This style is found at the Point Barrow Birnirk site, at Cape Prince of Wales, in some graves near East Cape, Siberia,[38] in a Western Thule house and in Tigara burials at Point Hope,[39] and at the Ahteut and Ekseavik sites (dating 1250 AD and 1400 AD respectively by a tree-ring chronology) on the Kobuk River.[40] This type of design is also known from the lower levels at the Nukleet site on Cape Denbigh.[41] One point that concentric circle decorated ware has in common is that it is usually from relatively early Eskimo remains, the most recent examples in the Kotzebue Sound region with a positive date being about 1400 AD[42] although farther north the type is present nearly to historic contact.[43] It is significant that line-dot decorated pottery has not been found in association with concentric circle pottery and is consistently found in more recent artifact assemblages. The same is true of the situla shape. Both the situla-shaped pot and the accompanying forms of decoration have been found in the relatively late sites on the lower Yukon River[44] and at Hooper Bay Village where there is every indication that the type ware was used after about 1600 AD.[45] The line-dot decoration is also stratigraphically more recent than the concentric circle motif in the Nukleet deposit on Cape Denbigh.[46] At the other sites where the combination is present (line-dot and situla shape) the associated artifact assemblages are late. Therefore, it appears that the line-dot ceramic style is a late exotic importation that has no tradition in earlier Alaskan wares.

Other significant forms of surface treatment of Alaskan pottery include short, broad horizontal impressions in vertical series,[47] basketry-impressions[48] and cord-marking,[49] but these appear so rarely that thus far their exact cultural position is obscure.

NORTHEASTERN SIBERIAN POTTERY PARALLELS

An attempt has been made in the foregoing pages to show the parallels between eastern Asian and Alaskan wares. It can hardly be doubted that the direction of influence was from west to east if one considers the antiquity of

38 De Laguna, 1947, pp. 233-234.
39 Larsen and Rainey, 1948, pls. 91, 8, 10; 95, 20.
40 Giddings, 1952, pp. 94-95.
41 University of Alaska collection.
42 Giddings, 1952, p. 95.
43 Larsen and Rainey, 1948, pl. 91, 8, 10.
44 De Laguna, 1947, pp. 140-149.
45 Oswalt, 1952b, p. 73.
46 University of Alaska collection.
47 Oswalt, 1952a, p. 28; Oswalt, 1953.
48 Giddings, 1952, p. 95.
49 Larsen, 1950, p. 183; Griffin, 1953, pp. 40-42; Oswalt, 1953.

the Japanese finds and the fact that the Alaskan similarities are relatively late, localized, and not derived from a domestic base. The question that next arises is whether this ware came to Alaska across Bering Straits or via the Aleutian Islands. The Bering Straits aspect of the problem seems best approached by considering the areal distribution of pottery first in northern Asia and then in western Alaska.

The pottery from Neolithic sites north of Vladivostok along the Amur River presents one of the clearer archaeological pictures in northeastern Siberia. Field and Prostov[50] list three artifact assemblages, each with a more or less differentiated pottery style. These styles are more elaborate than the Proto-Jomon or Alaskan types, but at the same time they employ motifs significant in our discussion. One type has flat-bottomed cylindrical vessels that are impressed with parallel zigzags which form the background for widely curved lines. The decorations are zonal, employing single and double spirals, zigzags and rhombic net impressions. Some ware has a crimson paint layer as the background to curved ribbons. The second pottery style is less developed than the preceding and includes bomb-shaped vessels with straight narrow necks. The decoration consists of applique belts superimposed over a slip. This ware also may be painted in black straight lines. The third pottery style includes vase-shaped jars with slender necks and wide lips. The decoration consists of indentations and paired knobs.

Davis[51] has summarized northeastern Siberian archaeology and has briefed many normally unavailable sources. Referring to pottery excavated by Schrenck from the Patcha and Naipuchi sites on Sakhalin Island Davis states that this ware has "fine rows of adjoining impressions, or sometimes a sort of wickerwork . . . in stripes and bands that crisscross." In the Vladivostok region[52] the pottery is decorated with triangular and circular punctations, incised horizontal lines used alone or with dot combinations and, in one example, a horizontal line with short oblique lines running from it.

At the Alder River on Siura Ara Island in eastern Siberia there have been limited excavations; as Davis[53] points out, this is virtually the only excavated Stone Age site from the Lena River to Bering Strait. The pottery is cord-impressed, mat-impressed, and "rippled," while other sherds from the island are "stamped, stroked, combed," or like the preceding. One of the illustrated sherds from the site seems to have an incised horizontal line with dots above it and two

50 Field and Prostov, 1937, pp. 457-490.
51 Davis, 1940.
52 *Idem*, pp. 31-32, fig. 5.
53 *Idem*, p. 34.

stroked (?) lines above the dots.[54] The only other archaeological find of note is reported by Jochelson[55] from Nayakham River mouth. The illustrated sherd from this site has ridges and grooves; the remainder of the pottery is represented by a partially reconstructed vessel with a well rounded bottom and slightly inward curving sides. This pot is impressed on the outside with twined basketry.

None of the pottery just described from the Siberian mainland appears to be very similar to the Proto-Jomon or Kamchatkan wares, and the relationship with Bristol Bay-Norton Sound pottery from Alaska is equally as remote; the line-dot decoration and zigzags show a style similar to the ware under consideration, but we cannot point to any unified northeastern Siberian assemblage of pottery traits that forms a comparative parallel.

From the archaeological investigations on St Lawrence Island, which is at its nearest point just forty miles from Siberia, comes the best sequence of Eskimo prehistory in the Bering Strait area.[56] The St Lawrence Island cultural stages seem to reflect those of the adjacent Siberian coast and therefore differ from the pattern of most Eskimo sites on the Alaska mainland.[57] If the line-dot etc.-decorated, situla-shaped pots came to Alaska via Bering Strait, then these types should be found on St Lawrence Island, where there is a 2000 year old Eskimo pottery tradition (wood from an Old Bering Sea I [Okvik] house on St Lawrence Island dates 2258 ± 230 years by the C-14 method).[58] But, as previously pointed out, the early pottery from this area is plain, linear-stamped, and rarely check-stamped; by the late Punuk period decoration disappears entirely according to Collins,[59] and Geist and Rainey[60] state that the pottery from the Kukulik mound during the recent period is "Unlike pottery from Nunivak Island and Norton Sound . . . no decorative elements of any kind are present." These statements, however, must be modified since the writer recovered horizontal line and other decorated sherds from the upper levels at the Kukulik midden in 1948.[61] The early conical and occasional flat-bottomed pots are largely replaced during the late Punuk period by rectanguloid flat-bottomed vessels with outside suspension lugs at each corner. These are copies of Greenland soapstone pots[62] that

54 *Idem*, fig. 6, k.
55 Jochelson, 1905-08, pp. 639-640, fig. 165.
56 Collins, 1937.
57 Rainey, 1953, p. 45.
58 Johnson, 1951, p. 15.
59 Collins, 1937, pp. 238-239.
60 Geist and Rainey, 1936, p. 130.
61 Oswalt, 1953.
62 Collins, 1937, p. 369; de Laguna, 1947, pp. 231-232.

spread to northern Alaska during the late prehistoric period, but they too have been found with line decoration at Kukulik. On St Lawrence Island there are no line-dot decorated situla-shaped pots similar to those of the Bristol Bay-Norton Sound region of Alaska, but line decoration alone is present. It must be pointed out that line-dot decorated sherds are present at Cape Nome,[63] which certainly is not far from Bering Straits.

It is difficult to bridge the gap between eastern Asian and Alaskan line-dot pottery with a Bering Strait gateway, but it is equally difficult to envisage an Aleutian route. Most important is the fact that the Aleuts have no pottery tradition and the archaeological sites have yielded only a few sherds. It appears that in the Aleutians most cultural stimuli came from the Alaska mainland, and yet there is irrefutable evidence of certain cultural connections between the Aleutian Islands and Kamchatka and Japan. The most striking examples are the stone lamp with a suspension hole at the end, which Collins suggests may have moved from east to west,[64] the semi-subterranean house with a smoke hole entrance, aconite whale poisoning,[65] the sickle,[66] and forms of lamp decoration.[67] The question is not whether it is possible for traits to arrive in Alaska via the Aleutians but whether the Bristol Bay-Norton Sound pottery was such a trait.

SUMMARY

In the foregoing comparison it has been shown that the distinctive pottery from the Bristol Bay-Norton Sound region of Alaska is relatively recent and has as its distinctive characteristics the situla shape and decorations consisting of line-dot motifs, split dots, shell-made zigzags, shell-made striations, triangular shell-made punctates, vessel knobs, and ridges and grooves. This ceramic style has been shown not to have a local base in Alaska but rather to be a recent importation into the area. *All* the designs characteristic of the situla-shaped vessel in Alaska have also been reported from northeastern Asia. The oldest pottery parallel is with Proto-Jomon of northern Japan, where there is ware decorated with line-dot, split dots, shell-made striations, shell-made zigzags, and rim knobs; the situla shape was introduced near the end of the period. It is noteworthy that some of the Late Proto-Jomon ware survived locally in northern Japan throughout the entire Jomon period and could have influenced later Kurilian and Kam-

63 Oswalt, 1953.
64 De Laguna, 1934, p. 180; Collins, 1937, p. 348.
65 Heizer, 1943.
66 Heizer, 1951, pp. 247-252.
67 De Laguna, 1947, pp. 249-250.

chatkan wares. Interesting too is the fact that split dots and shell-made striations are found in Alaska and Japan but not in the Kurile Islands nor Kamchatka; just as shell-made striations dominate as a type of vessel treatment on one form of the Proto-Jomon pottery so does the same feature dominate as the decorative style at the Hooper Bay Village site in Alaska.

None of the Kurile Island ware is strikingly similar in its decoration with either Proto-Jomon or late Bristol Bay-Norton Sound Alaskan ware. The rim knob and the situla shape are, however, a good link between the two and it seems noteworthy that the cord-impressed ware from the Kurile Islands includes a flat-bottomed, fiber-decorated vessel bottom recalling the mat- and line-impressed vessel bottoms from Alaska. The important comparable pottery in Kamchatka is from the Kulki and Kavran river sites where the sherds are decorated with lines and dots, horizontal and short vertical lines, dots alone, shell-made zigzagged lines, triangular punctates shell-made (?), and vessel ridges and grooves. Shell-made zigzags link the Japanese and Kamchatkan wares but have not been reported from the Kurile Islands, nor are the zigzags on pottery from the adjacent Siberian mainland recognizably made with a shell.

In view of the fact that the Japanese-Kurilian-Kamchatkan and Bristol Bay-Norton Sound pottery complex is not thus far recorded from northeastern Siberia nor from St Lawrence Island—where there is a 2000 year old pottery sequence—it is tempting to consider passage of the complex through Bering Strait as not feasible and to suggest a path of entry via the Aleutian Islands. However, even though an exchange of traits between Kamchatka and the Aleutians has been recognized, the absence of pottery in any form in the Aleutians makes such a suggestion border upon speculation.

Bibliography

Baba, O.
1939 *Handbook of Anthropology and Prehistory* (Tokyo, vol. 10, no. 11).

Collins, H. B. Jr.
1937 *Archeology of St. Lawrence Island, Alaska* (Miscellaneous Collections, Smithsonian Institution, vol. 96, no. 1).

Davis, E. M.
1940 *The Archaeology of Northeastern Asia* (Papers of the Excavator's Club, Cambridge, Mass., vol. 1, no. 1).

Field, H., and E. Prostov
1937 *Archaeology in the Soviet Union* (American Anthropologist, vol. 39, pp. 457-490).

GEIST, O. W., AND F. G. RAINEY
1936 *Archaeological Excavations at Kukulik, St. Lawrence Island, Alaska* (Miscellaneous Publications of the University of Alaska, vol. 2).

GIDDINGS, J. L., JR.
1952 *The Arctic Woodland Culture of the Kobuk River* (Museum Monographs, University of Pennsylvania Museum).

GRIFFIN, J.
1953 "A Preliminary Statement on the Pottery from Cape Denbigh, Alaska" (in *Asia and North America Transpacific Contacts*, Memoirs, Society for American Archaeology, no. 9).

GROOT, G. J.
1951 *The Prehistory of Japan* (New York).

HEIZER, R.
1943 *Aconite Poison Whaling in Asia and America: an Aleutian Transfer to the New World* (Bulletin, Bureau of American Ethnology, no. 133: Anthropological Papers, no. 24)
1951 *The Sickle in Aboriginal Western North America* (American Antiquity, vol. 16, pp. 247-252).

JOCHELSON, W.
1905-08 *The Koryak* (Memoirs, Jesup North Pacific Expedition, American Museum of Natural History, vol. 6, pt. 2).
1928 *Archaeological Investigations in Kamchatka* (Publication, Carnegie Institution of Washington, no. 388).

JOHNSON, F.
1951 *Radiocarbon Dating* (Memoirs, Society for American Archaeology, no. 8).

DE LAGUNA, F.
1934 *The Archaeology of Cook Inlet, Alaska* (University [of Pennsylvania] Museum, Philadelphia)
1947 *The Prehistory of Northern North America as seen from the Yukon* (Memoirs, Society for American Archaeology, no. 3).

LARSEN, H.
1950 *Archaeological Investigations in Southwestern Alaska* (American Antiquity, vol. 15, pp. 177-186).

LARSEN, H., AND F. RAINEY
1948 *Ipiutak and the Arctic Whale Hunting Culture* (Anthropological Papers, American Museum of Natural History, vol. 42).

OSWALT, W.
1952a *Pottery from Hooper Bay Village, Alaska* (American Antiquity, vol. 18, pp. 18-29).

1952b *The Archaeology of Hooper Bay Village, Alaska* (Anthropological Papers, University of Alaska, vol. 1, no. 1).

1953 *Pottery from the Bering Strait Region* (Anthropological Papers, University of Alaska, vol. 2, no. 1).

QUIMBY, G. I.

1947 *The Prehistory of Kamchatka* (American Antiquity, vol. 12, pp. 173-179).

RAINEY, F. G.

1940 *Eskimo Prehistory: the Okvik Site on the Punuk Islands* (Anthropological Papers, American Museum of Natural History, vol. 37, pt. 4).

1953 "The Significance of Recent Archaeological Discoveries in Inland Alaska" (in *Asia and North America Transpacific Contacts*, Memoirs, Society for American Archaeology, no. 9).

SCHNELL, I.

1932 *Prehistoric Finds from the Island World of the Far East* (Bulletin, Museum of Far Eastern Antiquities, no. 4, pp. 15-104).

UNIVERSITY OF ALASKA
COLLEGE, ALASKA

PHYSICAL ANTHROPOLOGY AND ITS INSTRUMENTS: AN HISTORICAL STUDY[1]

LUCILE E. HOYME

LIKE many another modern science, physical anthropology began to take form about the beginning of the 19th century. The era was one of revolution and expansion—the Industrial Revolution had just begun, and political revolutions, such as the American and French, were current events. The Age of Enlightenment, which had begun in the previous century, was a time of lively questioning of authority, keen interest in matters of politics and general culture, and increasing emphasis on empirical methods in science. The time, too, was one of geographical exploration—explorations with programs of research in the natural sciences which sound amazingly modern. In this day and age, when the basic biological sciences are given grudging Governmental support and relegated to obscure departmental niches, accounts of such government-sponsored expeditions as those of Lewis and Clark, the *Beagle*, the *Bounty*, the *Rattlesnake*, and the *Endeavor* are impressive.

With new corners of the world being opened up by traders, missionaries, explorers, and colonists, it was only natural that the new kinds of plants and animals and men they brought back should engage the attention of the naturalists of the day. The realization that groups of men differed from each other in more than skin color and clothing was slow in coming. Early artists, in picturing other races, had been content to draw a European face and color it dark, and to put exotic costumes on bodies drawn according to traditional canons. On the other hand, there was the recent classification of Linnaeus, dividing the species *Homo sapiens* into the varieties *europeus*, *asiaticus*, *americanus*, *asser*, *ferus*, and *monstruosus*. Primitive man, too, was viewed from contrasting aspects—the glorification of the noble savage by the poets and philosophers on one hand, and Lord Monboddo's study of primitive language by observations of "wild" children on the other. There were numerous questions to be answered, and, for the first time, a wealth of material to be studied. To be sure, many of these problems amounted merely to the confirmation of a philosophical viewpoint or the refuta-

1 I wish to express my appreciation to Dr T. D. Stewart, Curator of Physical Anthropology, United States National Museum, for his coöperation in placing the library facilities of that Division at my disposal while making this study; and to the Smithsonian Institution Photographic Laboratory for photographs from which the accompanying illustrations were made.

tion by new scientific techniques of an unpopular opinion. Yet, in essence, these were the beginnings of the scientific study of man's place in the animal kingdom.

The earliest physical anthropologists included artists interested in race differences, comparative anatomists, psychologists, paleontologists, anatomists, philosophers—an assortment of professions not far different from that to be found in the American Association of Physical Anthropologists of today—having as common ground their desire for perspective on man. When the techniques, ideas, and personnel of these varied fields were pooled, something new emerged. This new thing was the systematic study of physical man by means of measurement. Measurement is the oldest and most distinctive hallmark of the physical anthropologist. Although, by their nature, some of the contributing fields of knowledge deal in terms of non-metric observations, problems involving the absolute and relative size of man's body have formed the nucleus of anthropological investigations through the years, and have given direction and character to these studies.

Having outlined the background against which physical anthropology emerged, the next step is to trace its growth and development to the present. In selecting source material, the historian of science is faced with a problem similar to that of the biographer. Biographers often must depend to a large extent on the correspondence of their subject, his diaries and memoirs; occasionally this is supplemented by a few possessions which have been preserved by the family or friends. Similarly, historians of science usually endeavor to reconstruct the past by an evaluation of the writings of the workers in the field. There is, however, other, more direct evidence. Just as the possessions of an individual give an immediate impression of his interests, the instruments of a science reflect the interests and backgrounds of its contributors. Since measurement is the oldest and most distinctive technique of physical anthropology, the anthropometric instruments of the past two hundred years have been reviewed to see how the evidence which they embody supplements what is known of the history of the science. This paper, then, is not only a summary of the development of physical anthropology from the standpoint of problems and techniques; it is also an experiment in a relatively untried method of historiography. Although there are histories of the instruments of various sciences, there are few histories of any science based largely upon the information which may be inferred from its instruments.[2] Such an approach involves a number of difficulties. First, the restriction of the data to a single type of evidence—necessary for testing the method—has resulted in

2 Cf. Sigerist, 1951, pp. 19-20.

the omission of some names traditionally occupying places of honor in histories of anthropology, and the inclusion of others less well known. That such men as Tyson and Blumenbach are not mentioned is due solely to the fact that they made no contributions of the kind considered here. For this reason, the resulting history, while agreeing in general with those of Topinard (1885a), Hrdlička (1920) and others, differs from them somewhat in the *dramatis personæ* and in emphasis. Finally, it must be stated that the fifty-odd instruments mentioned have been selected from some six hundred described in the literature. In many cases other instruments would have illustrated the points equally well; that more were not cited is due to limitations of space. A full annotated bibliography of anthropometric instruments is in preparation and will appear at a later date.

FORERUNNERS OF PHYSICAL ANTHROPOLOGY

Artists were probably the first group to be interested in man's body proportions. Canons summarizing the relative sizes of parts of the body go back to the early days of Greece and Egypt and seem to have been handed down from master to student for many generations. Whether these rules of thumb were originally based on actual measurement is impossible to determine; but certainly they were close enough to reality to suffice. It is likely that such artists as Dürer and da Vinci developed canons of their own based on actual measurement. Dividers or a rod of standard length would have had to be employed for such measurements since calipers did not come into use until about 1540 (Knight, 1874). Their invention is attributed to an artificer of Nuremberg, Germany. Undoubtedly such a useful device was adopted immediately for many purposes.

The first instrument specifically intended for the measurement of man seems to have been the "anthropometron" described by Elsholtius, a German artist and physician, in 1663.[3] This consisted of an upright, "the length of the body of the subject" which had been divided into 6 "feet," which in turn were subdivided into 12 "inches." The upright, which was fitted into a base, had a fixed cross-piece, a "foot" long and divided into 12 "inches," at its top and a sliding horizontal bar. Although the anthropometron did not record exact measurements, it was an attempt to establish objectively the relative proportions of the body with an instrument designed expressly for the purpose.

One of the next instruments was designed by Peter Camper, also an artist and physician, and presented around 1770.[4] After receiving his degree in medi-

3 A description may also be contained in the first edition published in 1654.

4 The posthumous edition of his works published by his sons in 1791 contains drawings made with the instrument, and a description of it, but no illustration of it. Vallois (1940) states that there is one in the Broca Laboratory in Paris.

cine and philosophy in 1746, he conducted public dissections in Amsterdam as professor of anatomy. He had long been dissatisfied with the canons taught him as an art student and made good use of his opportunity to study the faces of the various races he saw in Amsterdam, both in life and on his dissecting table. His new canons for drawing the faces of men of various races and ages won him a gold medal from the Academie de Dessein. Extending his studies of the face

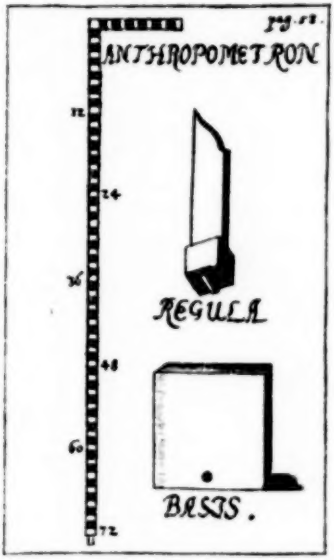


FIG. 1. Elsholtius' anthropometron, 1663.

to the lower animals, he believed that he found a correlation between the facial angle and intelligence. His apparatus for drawing the skull and head, and thereby obtaining the facial angle indirectly, consisted of a frame with cross threads, the intersections of the threads providing points of reference.

Contemporary with Camper were the obstetricians Smellie and Baudelocque. Although Smellie published the first measurements on the pelvis in 1752, he does not state how these were obtained. Baudelocque (1775) seems to have been the first to describe a caliper for obstetrical measurement (Jarcho, 1933). Baudelocque's pelvimeter, as well as its lineal descendant the Martin spreading caliper, is still in use.

THE EMERGENCE OF PHYSICAL ANTHROPOLOGY AS A SCIENCE

The beginning of physical anthropology as a science is usually dated by the formation of the Société d'Anthropologie de Paris in 1859. However, sixty years earlier, the medical school at the University of Edinburgh provided men and materials for the first center of physical anthropological study. Here, for the first time, there was a group of men of different backgrounds engaged in making phylogenetic and racial comparisons of both the living and the dead.

The University of Edinburgh in the early 1800's was one of the centers of medical education in Europe, attracting such students as John C. Warren (later professor of anatomy at Harvard), Charles Darwin, and Samuel G. Morton (later professor of anatomy at the University of Pennsylvania). It had on its staff such teachers as Alexander Monro II and his son Alexander Monro III, the brothers John and Charles Bell, and Charles White, all of whom made important contributions to anatomy (Mettler, 1947). In addition to purely anatomical studies, there was considerable interest in race differences. Thus in 1799, White published the first comparative studies of the long bones of Whites and Negroes, using measurements he had taken with a caliper. His series included 12 Europeans and 50 Negroes, and the skeletons of 9 Europeans, 1 Negro, a monkey, and Tyson's "pygmy." A few years later, in 1809, Charles Bell compared White and Negro crania by balancing them on an iron rod (his "pivot") inserted through the foramen magnum; he concluded that the angle between the perpendicular rod and a line from the occipital opening to the superior border of the orbit was a better measure of the relation of the face to the brain case than Camper's facial angle (Meigs, 1861, pp. 852-854).

In reconstructing the family tree of their science, physical anthropologists are likely to pass over phrenology quickly and put most emphasis on more sober sciences such as anatomy. Yet phrenology is as truly an ancestor of physical anthropology as astrology is of astronomy, or alchemy of chemistry. Indeed, phrenology has probably had much more influence on the development of physical anthropology than one may realize. Although Blumenbach and Camper and Bell had already pointed out race differences in the crania they observed, the phrenologists were the first to try to express these differences in terms of measurements. The landmarks from which they measured, as Topinard noted (1885a), are almost the same as those used today by physical anthropologists, although their names have been changed.[5] The instruments which they used have left descend-

5 Topinard (1885a, pp. 131-132) gives a partial list of the phrenological landmarks and their anatomical equivalents.

ants in modern laboratories. Not least, the possible applications of the pseudoscience—in addition to stimulating popular interest—undoubtedly were an incentive to the scientific testing of its claims and to the assembling of cranial collections for study.[6]

It was at the University of Edinburgh that phrenology received its first and most important academic recognition. After establishing a phrenological society in Paris with his friend and teacher Gall,[7] Spurzheim came to Edinburgh in 1815 to give a course of lectures. One of those attending the lectures was George Combe, who had come to scoff, but was converted wholeheartedly to the teachings of the new science. Unlike Gall and Spurzheim, who were satisfied with visual or tactile estimates of the sizes of the "bumps" on the heads they examined, Combe attempted to make such observations objective through the use of measurements. His textbooks (1826) defined the rather vague landmarks of Gall and Spurzheim and gave directions for measuring; they also recommended a spreading caliper and a "craniometer" for the measurements. The source of the caliper is unknown, but the craniometer was designed by William Gray and Robert Ellis, two members of the Edinburgh Phrenological Society. The craniometer, which they presented to the Phrenological Society in 1824 (Combe, 1824), consisted of a semicircular frame, with a graduated rod at each end to hold the frame in the ear-ear axis (the middle of the axis corresponding to the center of the circle), and a graduated radial rod which measured the distance from the center of the circle to any point on the surface of the head. Since, as Gall taught, the brain

6 For example, the collection of the Boston Phrenological Society, which flourished from 1832 to about 1842, was presented to the Warren Anatomical Museum at Harvard.

7 Capen (1881) gives the following account of why phrenology did not become established in Paris:

"In 1808 they [Gall and Spurzheim] presented a joint memoir on the anatomy of the brain to the French Institute. . . . The chief of the anatomical department was M. Cuvier, and he was the first member of this learned body to whom Drs. Gall and Spurzheim addressed themselves.

"M. Cuvier was a man of known talent and acquirements, and he was high authority in many branches of science. . . . He received the German doctors with much politeness . . . [and] attended a course of lectures given purposely for him and a party of his selection. . . .

"About this time the Institute had committed an act of extraordinary courage in venturing to ask permission of Bonaparte to award a prize medal to Sir H/ Davy. . . . Consent was obtained, but the soreness of national defeat rankled deeply within. When the First Consul was apprised that the greatest of his comparative anatomists had attended a course of lectures by Dr. Gall, he broke out as furiously as he had done against Lord Whitworth; and, at his levee, berated the wise men of his land for allowing themselves to be taught chemistry by an Englishman and anatomy by a German. . . . A commission was named by the Institute to report upon the labors of Drs. Gall and Spurzheim. M. Cuvier drew up the report. In this he used his efforts —not to proclaim the truth, but to diminish the merits of the learned Germans" (pp. 91-92).

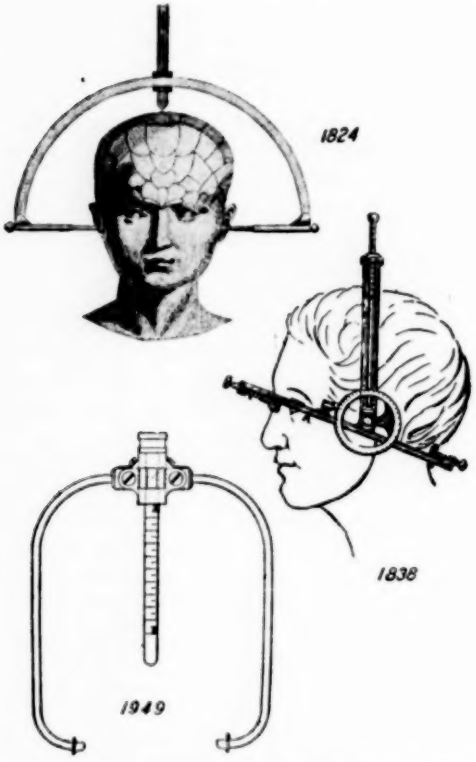


FIG. 2. Headspanners: 1824—the phrenological craniometer of Ellis and Gray (Combe, 1824); 1838–Antelme's cephalometer; 1949–Imbelloni's acrómetro (Bórmida, 1949).

was composed of cone-shaped "organs," whose tips met at a point midway between the ears, the distance from that point to the surface of the brain would be correlated with the size and activity of the underlying organs. This craniometer is almost certainly the basis for the cephalometer designed in 1834 by Antelme in connection with his thesis on the physiology of thought. Antelme's cephalometer, which was presented to the French Academy in 1838 and to the Société d'Anthropologie de Paris in 1861 (Antelme, 1838, 1863), is credited by many later

designers of similar instruments (e.g. Bórmida, 1949) as their source. Antelme's, it should be added, was only one of a large number of instruments for taking phrenological, and later anthropological, measurements.

It is almost certain that Morton came under the influence of Combe while studying medicine at the University of Edinburgh in 1825. It was in 1830, only five years later, that Morton began to assemble his collection of crania for demonstration to his anatomy students at Pennsylvania College (now the University of Pennsylvania) in Philadelphia. Whether or not he also used them for phrenological studies is unknown. However, when he issued the prospectus for his *Crania Americana* about 1835, he stated that he intended to include a chapter on phrenology. In his introductory letter in his *Crania Americana* (1839), addressed to John Phillips who assisted him, Morton states:

> In this study [phrenology] I am yet a learner; and it appeared to me the wiser to present the facts unbiassed by theory, and let the reader draw his own conclusions. You and I have long admitted the fundamental principles of Phrenology, viz.: That the brain is the organ of the mind, and that its different parts perform different functions: but we have been slow to acknowledge the details of Cranioscopy as taught by Dr. Gall, and supported and extended by subsequent observers. . . . Yet I am free to acknowledge that there is a singular harmony between the mental character of the Indian, and his cranial developments as explained by Phrenology (p. ii).

With this in mind, Morton had asked a friend (unidentified) to prepare a section on phrenology for the book, but when his friend was unable to comply, Morton himself prepared a set of phrenological tables. Just as the book was ready for the press, however, George Combe (recently nominated for the chair of philosophy at Edinburgh) arrived in Philadelphia. On December 31, 1838, Combe reported,

> This day I visited Dr. Morton's collection of American Indian skulls, which is valuable and extensive, and his specimens are well authenticated. I had the pleasure of showing him and Mr. Phillips, who assists him ardently in the measurements necessary for his beautiful and extensive work on these skulls, the method pursued by the phrenologists in estimating the dimensions of the coronal region and anterior lobe of the skull (Combe, 1841, pp. 186-187).

Again the next day, January 1, 1839, he met Morton and Phillips and discussed the method of measuring the skull. In the course of this visit he says: "I greatly admired Dr. Morton's method of drawing the skull on a reduced scale. . . . I narrowly scrutinized a number of [the drawings], holding the original skulls in my hand, and trying them and the plates by means of callipers, and found them faultless" (p. 187). As a result of these visits, Combe agreed

to take a new set of phrenological measurements and prepare the desired essay on phrenology.

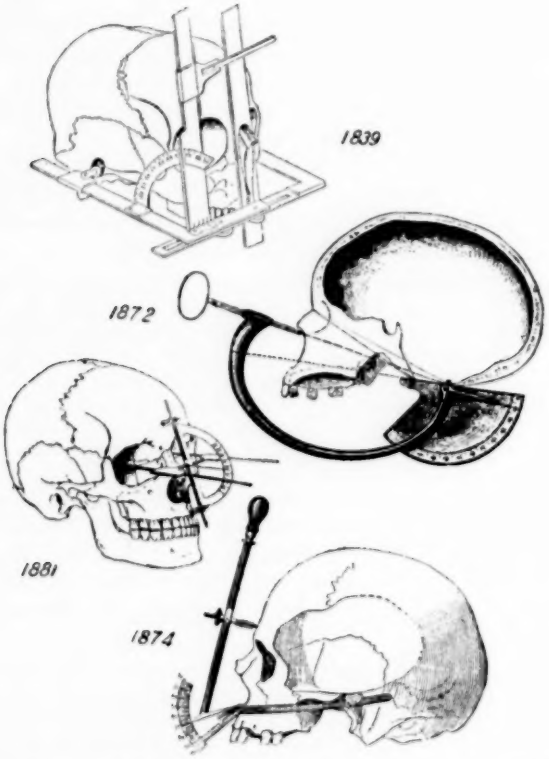


FIG. 3. Goniometers: 1839–Morton's facial goniometer; 1872–Broca's occipital goniometer; 1874–Broca's median facial goniometer; 1881–Atkinson's facial goniometer.

That Morton's interests went far beyond the traditional limits of phrenology is obvious from the number of measurements and instruments he used. He describes and illustrates a facial goniometer, a craniograph for drawing skulls, and a craniophore and other apparatus for taking cranial capacity. The facial goniometer, designed for Morton by Dr Joseph Turnpenny, is apparently the

first instrument which measured the facial angle directly. It consisted of an adjustable F-shaped frame in which the skull was placed; an upright bearing a cross-piece (which rested on the frontal bone of the skull) was joined to one corner of the frame by a hinge, and the angle was read from a protractor at the joint of the upright to the frame.

Morton's craniograph, designed by John S. Phillips, consisted of a board 6 feet long and 1 foot wide. The skull was placed on a stand about 1 foot from one end, and, by sighting through an upright eyepiece at the other end, a reduced drawing of the skull was made in ink on a glass plate about one-fifth of the distance from the eyepiece to the skull.

The cranial capacity apparatus, also designed by Phillips, consisted of a craniophore and a volumetric device. The craniophore was a rectangular wooden frame, with a hole cut in one side to accommodate the skull which was held in position by set screws. Careful positioning of the skull was necessary because, in addition to total capacity, Morton measured the capacity of various segments of the skull. The volumetric apparatus consisted of a metal cylinder into which the measuring substance (white pepper seeds) was poured, and a graduated rod which rested on the surface of the pepper. Of this group of instruments, the facial goniometer, a phrenological craniometer, and a straightedge for use with the craniophore are still in the Academy of Natural Sciences in Philadelphia. Although Morton mentions that his linear measurements were taken with craniometer and calipers, he does not describe either instrument. Since his craniometer is the phrenological craniometer described above, and was made by a Philadelphia instrument maker, it is likely that his calipers were of this type also. This probability is strengthened by the fact that Carus, who also had phrenological interests, illustrated a caliper of this type in 1858, stating that he had used it for a number of years.

THE EXPANSION OF PHYSICAL ANTHROPOLOGY

Although only Combe and Morton have been mentioned, they were by no means the only persons of the early 19th century interested in anthropological problems. On the contrary, the number of contributors to anthropology had increased as rapidly as the skeletal collections available for study and the biological theories to be tested. Indeed, in a historical survey published in 1861, J. Aitken Meigs summarized an impressive variety of craniological techniques, ending with a plea for standardizing both the landmarks and the assortment of measurements to be taken. By this time embryologists such as von Baer, surgeons such as Broca, pathologists such as Virchow, and many others were engaged in

studies of man. The time, then, was ripe for the formation of societies under whose auspices these men from different disciplines could pursue their common interest. There had been earlier societies—a short-lived " Société des observateurs de l'homme" founded in Paris about 1799 and a "Société ethnologique de Paris" which flourished from 1839-1848, not to mention the numerous phrenological societies which sprang up in various cities under the guidance of Combe and Spurzheim, but soon languished.

Of the anthropological societies still surviving, the Société d'Anthropologie de Paris, formed in May, 1859, is the oldest in Europe. Within a relatively few years of its founding, societies were established in New York, London, Moscow, Madrid, Florence, Berlin, Vienna, Washington, Lyon, Brussels, and Bordeau (Topinard, 1885a, p. 147). These societies formed a common meeting ground for those interested in human biology and provided publication outlets which tended to concentrate in a few journals papers which would otherwise have been scattered in many. Such are the forces which give a new science a name, an identity, a shape, and a unity.

The Paris society was probably fairly typical of the early societies. A large number of the papers presented in its sessions dealt, of course, with ethnology and prehistory. Yet there are a large number of papers on physical anthropology, many of which are illustrated with figures of new types of instruments. Paul Broca, a physician and one of the founders of the Société, was by far the most prolific contributor to the instrumentation of physical anthropology. The papers appearing between 1860 and the time of his death in 1880 contain descriptions of over forty of his instruments, and others were described after his death by his student Topinard. Among Broca's instruments were a spreading caliper derived from Baudelocque's pelvimeter (1865), an anthropometer, orbitostats for determining the axis of the visual plane (1873a), a torsiometer (1881), craniophores and craniostats (1861, 1868), a sliding caliper with logarithmic graduations for measuring curvature (1874b), a craniograph (1861) and stereograph (1868), and some dozen instruments for studying the interior of the skull (1872, 1873b). To expand the usefulness of his spreading caliper he added an upright branch converting it into a coördinate caliper (Topinard, 1885a), and a pair of small branches for micrometer readings (1869). Like many other early anthropologists he was interested in the various angles of the skull and devised instruments for measuring them. Among such instruments were goniometers for measuring Camper's facial angle (1864, 1874a) and Daubenton's occipital angle (1872). Most of these instruments are no longer in use. However, his mandibular

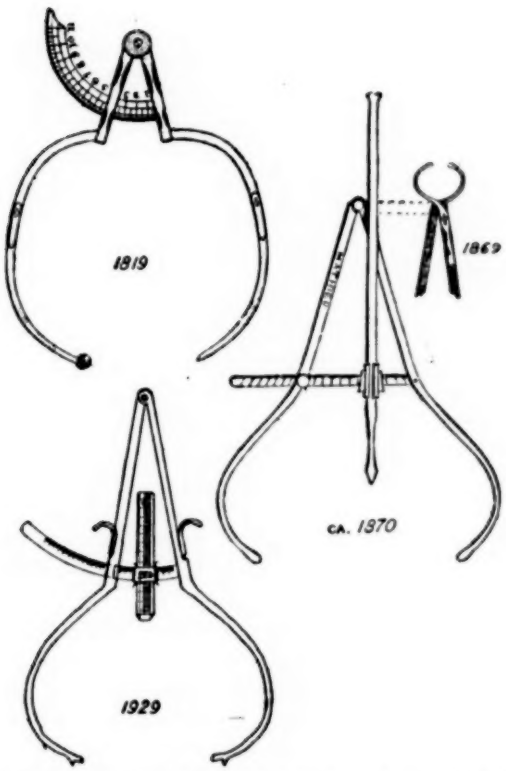


FIG. 4. Spreading calipers: 1819–the phrenological caliper: the branches folded so that the caliper could be carried in the pocket, and the pointed tips of the arms were protected with removable knobs (see Combe, 1826); 1870–Broca's 3-branched caliper (see Topinard, 1885a); 1869–Broca's compas micrométrique, i.e., miniature arms which could be added to the standard caliper for measuring small objects; 1929–Stevenson's modification of Hrdlička's caliper.

goniometer (1875), his osteometric board (Topinard, 1885a), the dynamometer (1865) made by Mathieu under his direction, and his sliding and spreading calipers have undergone only minor changes. The skin and eye color standards which he included in his *Instructions générales pour les recherches et observations anthropologiques* (1865) have been revised and reprinted by various of his successors (e.g., Hrdlička, 1904). Although Broca experimented with various techniques for taking cranial capacity (1873c), neither he nor any other member of the Paris Society seems to have developed any new apparatus for this purpose.

Broca's interest in instruments was reflected in still other ways. Under his direction a collection of historical instruments was assembled in the École d'Anthropologie de Paris.[8] As editor of the publications of both the Société and the École d'Anthropologie, he may well have encouraged the numerous descriptions of instruments which appeared in these media.

Although Broca was the major contributor during this period, other members of the Paris Société presented instruments at the meetings. Among those described during the early days were a coördinate sliding caliper (LeBon, 1878); a sliding caliper with curved arms, similar to Flower's (1879), but with the upper ends of the arms reversed for taking internal diameters (Duhousset, 1875); a cephalometer derived from the phrenological craniometer (Antelme, 1863); a stethograph for measuring chest circumference (Maurel, 1887), an instrument for measuring nose width and projection (Mérejkowsky, 1882), along with various calipers, facial goniometers, and other devices for recording contours of the head and face.

Broca's influential position in Paris and his liaison with the instrument makers Collin and Mathieu probably did much to establish his instruments as standard equipment among French anthropologists. His own texts on anthropometry (1865, 1875, 1879) and that of his student Topinard (1885a) illustrate and recommend them. Their acceptance in Germany is suggested by their inclusion in Emil Schmidt's *Anthropologische Methoden* (1888). Of the 40 instruments Schmidt illustrates, 19 are Broca's.

At the 13th General Congress of the German Anthropological Society held at Frankfort-am-Main in 1882, a standardized system of landmarks was adopted by the majority of the German anthropologists present. Among the changes was the substitution of the eye-ear plane for the older planes of Broca, Camper, and Blumenbach. This, and other revisions, resulted in changes in a number of the

8 See Topinard, 1885a, p. 130; Vallois, 1940.

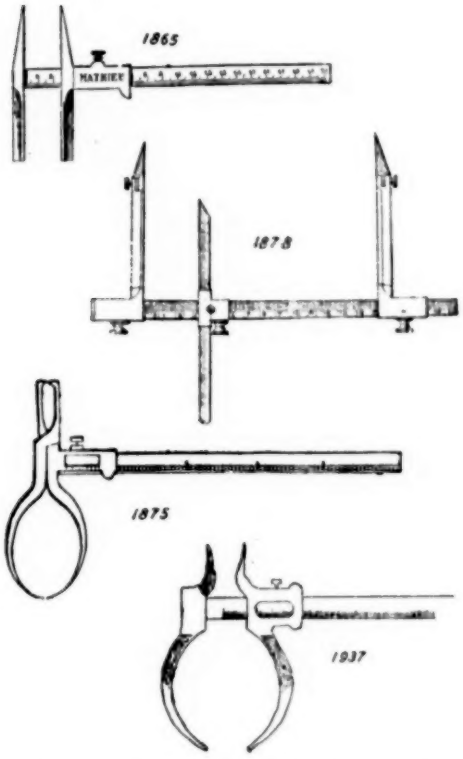


FIG. 5. Sliding calipers: 1865–Broca's; 1878–LeBon's coördinate caliper; 1875–Duhousset's caliper for measuring external and internal diameters; 1937–Montagu and Trevor's caliper.

measurements, which in turn required modification in some of the instruments used. Possibly for this reason, and possibly because of Broca's death in 1880, the leadership in instrument design seems to have shifted from France to Germany about this time.

Although there have been many outstanding workers in the German school, only four will be mentioned here: von Török, Benedikt, Mollison, and Martin. Among von Török's instruments was his "Universalkraniometer" which he illustrated extensively in his *Grundzüge einer systematischen Kraniometrie* (1890). This instrument attempted to combine all of the features of a sliding caliper, spreading caliper, coördinate caliper, goniometer, and craniometer, with attachments for taking a large proportion of the 5300 measurements he advocated. This instrument looks cumbersome and was probably quite expensive. Benedikt's craniophore (fig. 6), one of the instruments illustrated in his *Kraniometrie und Kephalometrie* (1888) is another of the elaborate instruments which seem to have enjoyed a short vogue about this time.

Mollison and Martin succeeded von Török and Benedikt about the turn of the century. Most of Martin's contributions seem to be improvements in existing instruments based on his extensive experience. Among these were his modifications of Broca's sliding and spreading calipers and an anthropometer (1899), bringing them into their modern form, along with several drawing instruments and craniophores. During the same period Mollison (1907) proposed a simple device for obtaining curvatures (his cyclometer) and a goniometer to be attached to the calipers or anthropometer.

From the assortment of instruments appearing in this period, it is clear that the interests of the anthropologists had extended beyond the skull to other parts of the skeleton and body and to physiological reactions. There were, of course, important studies not involving special instruments, such as Deniker's (1889) and Pruner-Bey's (1865, 1868) studies of the hair. There is indication too, of less interest in the relation of skull shape to mental ability, although there were still attempts to correlate physical traits with criminality and degeneracy. Faith in the facial angle as a diagnostic trait of great importance had declined, and with it the number of instruments designed to measure it. Instead, the emphasis seems to have shifted to the total physique of man, with attempts to describe and compare tribes and races as biological units, and to define the normal physical status of man. Such studies, without implications of racial superiority or inferiority, advancement or degeneracy, provided the basic, essential information necessary before the next steps could be taken.

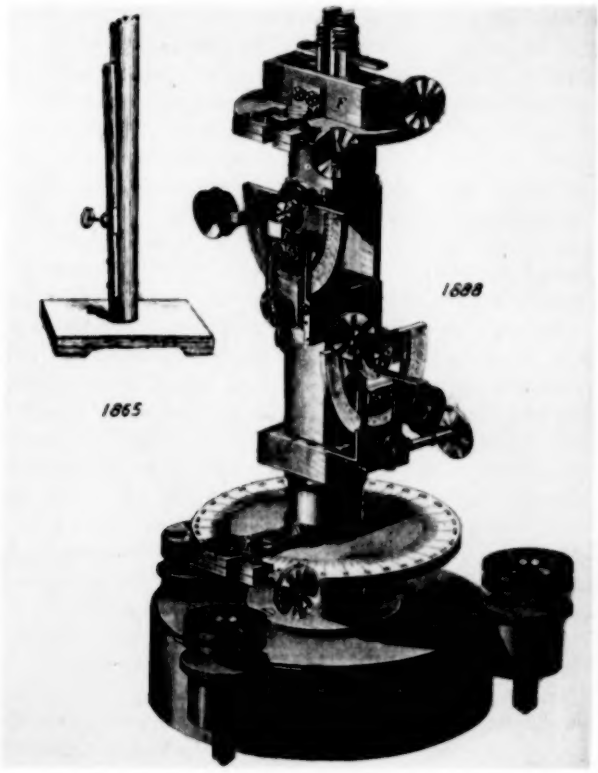


FIG. 6. Craniophores: 1865–Broca's; 1888–Benedikt's. The two instruments are shown at approximately the same scale.

PHYSICAL ANTHROPOLOGY COMES OF AGE

Like an individual, a science comes of age when it is in a position to contribute to society. As with human beings, it is difficult to define this transition to maturity in terms of a single event or accomplishment. The beginnings of the modern period, that of applied anthropometry, are probably to be found in the 20th century. Although there were earlier examples of the application of anthropometry to practical problems, the most notable being Bertillon's (1893) system of identification, it was not until after 1910 that anthropometry was used as a technique in a wide range of fields. Emmons' (1913) study on the pelvimetry of Indian women, the studies on child growth carried out by such organizations as the Iowa State Child Welfare Research Station, Matiegka's (1921) studies on physical efficiency, Franzen's (1929) studies on obesity are only a few examples of the increasing emphasis on practical applications, which reached their culmination in the Army anthropometry of World War II and succeeding years.

As a result of this application of anthropological techniques and ideas to problems of man in other fields, the descriptions of anthropometric instruments of the last few decades are scattered through as wide a range of periodicals as were those before the unification of anthropology. The exchange of techniques has not been one-sided. In return, the anthropologists have borrowed increasingly from other fields. The Schwarz stereograph (1928) was originally an orthodontic mapping device; studies on the living are correlated with those on skeletal remains by means of X-rays—witness the devices for positioning the body for roentgenograms (e.g. Bayer and Gray, 1933); and physiological tests, such as those for blood groups, have been adapted for anthropological ends. For these reasons, the assortment of instruments shown by any of the leading textbooks—Martin (1914, 1928), Hrdlička (1920), Stewart (1952), Schultz (1937), and Bunak (1941)—although reflecting a breadth of interest that would have amazed Morton or Broca, gives only a limited indication of the subjects that are legitimate territory for the modern physical anthropologist.

DICUSSION

The chronological account given above seems to bear out the initial premise that from the type of instruments found in a given period, it is possible to derive some idea of which physical characteristics the anthropologists of the past considered important. It is somewhat more difficult to draw conclusions as to why these measurements and indices were considered worthy of investigation. For this it is necessary to examine the studies against the climate of opinion of the period in which they were carried out.

The beginning of the 19th century saw the first systematic attempts at comparing the various groups of mankind—a natural consequence of the economic developments which had recently made new groups of mankind available for study. The frame of reference was the contemporary theory regarding the arrangement of creation into a great stairway from the lowliest animal to the angels and its philosophical implications as to the relative mental, moral, and physical development of different sectors of humanity. It is possible that it was this preoccupation with man's mind which fixed the attention of the earliest anthropologists on the skull as the seat of the brain and the face as the mirror of the soul, rather than on the body as a whole. At any rate, the majority of the earliest studies involve the skull or head, usually in an attempt to find correlations between shape and personality. There are only a few studies on other parts of the skeleton. The few instruments found in this period—spreading calipers for linear dimensions, craniometers for head height, goniometers for the various cranial and facial angles, craniophores, drawing devices, and a cranial capacity apparatus—are all fairly simple.

By 1860 the assumptions upon which the earlier studies had been based had been largely disproved. The following decades can be characterized as a period of trial and error and exploration, in which a wide variety of physical characteristics were examined to obtain basic data for both racial and phylogenetic comparisons. The greatest variety and number of instruments seem to come from this period. Variations in the width of the nose, the circumference of the chest, cranial arcs and diameters, and length and torsion of the long bones, most of which had been ignored by earlier anthropologists, were investigated. In the process, many of the instruments from the preceding period were modified, and new types were designed. In general most of the instruments of the period are fairly simple, but around 1890 a number of very elaborate gadgets are to be found —reminiscent of the Victorian gingerbread which characterized the architectural design of the period. By the end of the 19th century, almost all of the new instruments now in use were in their present form. After the turn of the century, however, there was a decrease both in the number of instruments and in the measurements taken. Since the aim of most of the 19th century anthropometry was racial comparison, there were attempts to standardize and limit the number of measurements to be included in studies by eliminating measurements of doubtful value or those depending on landmarks difficult to locate accurately. Most of the remaining measurements were linear and could be taken without difficulty with the calipers or anthropometer.

One of the main characteristics of the 20th century as a whole is the application of science to the problems of mankind. Thus the basic data of genetics have been used for producing better corn and turkeys, and those of physics for the atom bomb. Physical anthropology, like any other science, is being called upon increasingly to apply its techniques and basic knowledge to problems of sizing equipment and clothing, to identification of war dead, to derivation of growth patterns, to the assessment of nutrition, and to the calculation of subsistence rations for peoples of militarily occupied territories. Like earlier studies on unexplored subjects, many of the above problems have involved the utilization of new instruments, often designed particularly for the project at hand. In many cases these special-purpose instruments are elaborate, in that they measure a number of dimensions at one time, or that they employ systems of gears, electronic reading devices and the like, instead of the relatively simple scales of the past.

Regarding the next fifty years, it is difficult to make predictions. It is fairly certain, however, that anthropometry, the hallmark of physical anthropology, will be retained among the techniques of the anthropologist, although techniques from other biological sciences will undoubtedly be adopted where needed. Aside from inadequate adjectives such as "big," "small," "long," and "short," measurements and indices are the only possible way of recording and analyzing man's size and proportions. There are many problems involving size and proportion not yet solved, and perhaps not yet suggested by genetics, physiology, ecology, and comparative anatomy, for which anthropometry can provide basic data. In addition to the problems of pure science, there will be new applications for anthropometry, which will demand new measurements and instruments. The anthropometric instruments of the future will provide as rich a source of information to future historians of the science as the ones listed herein have provided to the writer.

Bibliography

Antelme, A.

1838 *Mémoire sur un nouvel instrument propre à mesurer les dimensions de la tête* (Comptes Rendus, Academie de Sciences de Paris, vol. 6, p. 789, June 4).

1863 *Note sur la céphalométrie* (Mémoires, Société d'Anthropologie de Paris, ser. 1, vol. 1, pp. 337-348).

Atkinson, G. M.

1881 *On a New Instrument for Determining the Facial Angle* (Journal, Anthropological Institute, vol. 11, pp. 122-123).

BAUDELOCQUE, J. L.
1775 *Principes sur l'art des accouchemens* (Paris: Mequignon; see also translation: *A System of Midwifery*, London, 1790, 3 vols.).

BAYER, LEONA M., AND H. GRAY
1933 *The Hand: Method of Measurement* (American Journal of Physical Anthropology, vol. 17, pp. 379-415).

BENEDIKT, MORIZ
1888 *Kraniometrie und Kephalometrie. Vorlesungen gehalten an der Wiener Allgemeinen Poliklinik* (Wien: Urban und Schwarzenberg).

BERTILLON, A.
1893 *Instructions signalétiques pour l'identification anthropométrique* (Melun, 2 vols.).

BÓRMIDA, MARCELO
1949 *El acrómetro. Instrumento para medir la altura cefálica* (Runa, vol. 2 (1-2), pp. 126-138).

BROCA, PAUL
1861 *Sur le craniographe et sur la determination de plusiers angles nouveaux nommes angles auriculaires* (Bulletins, Société d'Anthropologie de Paris, ser. 1, vol. 2, pp. 673-680).
1864 *Nouveau goniomètre* (Bulletins, Société d'Anthropologie de Paris, ser. 1, vol. 5, pp. 943-946).
1865 *Instructions générales pour les recherches et observations anthropologiques (Anatomie et physiologie)* (Mémoires, Société d'Anthropologie de Paris, ser. 1, vol. 2, pp. 69-204)
1868 *Sur le stéreographe, nouvel instrument craniographique destiné à dessiner tous les détails du relief des corps solides* (Mémoires, Société d'Anthropologie de Paris, ser. 1, vol. 3, pp. 99-124).
1869 *Nouveaux instruments craniographiques. Le cadre à maxima et le compas d'epaisseur micrométrique* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 4, pp. 101-104).
1872 *Sur la direction du trou occipital; description du niveau occipital et du goniomètre occipital* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 7, pp. 649-668)
1873a *Sur le plan horizontal de la tête et sur la méthode trigonométrique* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 8, pp. 48-92).
1873b *Sur l'endocrâne. Nouveaux instruments destinés à étudier la cavité crânienne sans ouvrir le crâne* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 8, pp. 352-383)
1873c *Sur la mensuration de la capacité du crâne* (Mémoires, Société d'Anthropologie de Paris, ser. 2, vol. 1, pp. 63-152).
1874a *Sur la valeur des divers angles faciaux et sur un nouveau goniomètre facial median* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 9, pp. 358-384).

1874b *Sur le cyclomètre, instrument destiné à determiner la courbure des divers points du crâne* (Bulletins, Société d'Anthropologie de Paris, ser. 2, vol. 9, pp. 676-686).

1875 *Instructions craniologiques et craniométriques de la Société d'Anthropologie de Paris* (Mémoires, Société d'Anthropologie de Paris, ser. 2, vol. 2, pp. 1-204).

1879 *Instructions générales pour les recherches anthropologiques à faire sur le vivant* (2nd. ed., Paris: Masson).

1881 *La torsion de l'humérus et le tropomètre, instrument destiné à mesurer la torsion des os* (Revue d'Anthropologie, ser. 2, vol. 4, pp. 193-210, 385-425, 577-592).

BUNAK, V. V.

1941 *Antropometriia* (Moscow).

CAMPER, PETER

1791 *Dissertation physique de M. Pierre Camper, sur les différences réelles que présentent les traits du visage chez les hommes de différents pays et de différents âges; . . . Suive de la proposition d'une nouvelle méthode pour dessiner toutes sortes de têtes humaines avec la plus grande sûreté* (Posthumous edition, translated from the Dutch: Utrecht).

CAPEN, NAHUM

1881 *Reminiscences of Dr. Spurzheim and George Combe, and a Review of the Science of Phrenology from the Period of its Discovery by Dr. Gall, to the Time of the Visit of George Combe to the United States, 1838-1840* (New York: Fowler and Wells).

CARUS, CARL GUSTAV

1858 *Symbolik der menschlichen Gestallt. Ein Handbuch zur Menschenkenntniss* (2nd ed., Leipzig: Brockhaus).

COMBE, GEORGE

1824 [*Proceedings of Edinburgh Phrenological Society*] (Phrenological Journal and Miscellany, vol. 1, pp. 322-323, 488).

1826 *Elements of Phrenology* (1st Amer. ed. from 2nd Edinburgh ed.: Philadelphia: E. Littell)

1841 *Notes on the United States of North America during a Phrenological Visit in 1838-9-40* (Philadelphia: Carey, 2 vols.).

DENIKER, J.

1889 *Essai d'un classification des races humaines, baseé uniquement sur les caractères physiques* (Bulletins, Société d'Anthropologie de Paris, ser. 3, vol. 12, pp. 320-336).

DUHOUSSET, E.

1875 *Mélanges anthropoligiques* (Mémoires, Société d'Anthropologie de Paris, ser. 2, vol. 1 for 1873, pp. 305-320).

ELSHOLTIUS, JOANN. SIGISMUNDI

1663 *Anthropometria, sive De mutua membrorum corporis humani proportione, et Naevorum harmonia Libellus* (2nd ed., Frankfort am Oder: A. Becman; 1st ed., Patavii, 1654)

EMMONS, ARTHUR BREWSTER

1913 *A Study of the Variations in the Female Pelvis, based on Observations made on 217 Specimens of the American Indian Squaw* (Biometrika, vol. 9 (1-2), pp. 34-57).

FLOWER, WILLIAM HENRY

1879 *Catalogues of the Specimens . . . in the Museum of the Royal College of Surgeons of England. Pt. 1: Man* (London).

FRANZEN, RAYMOND

1929 *Physical Measures of Growth and Nutrition* (School Health Research Monographs, American Child Health Association, no. 2).

HRDLIČKA, ALEŠ

1904 *Directions for Collecting Information and Specimens for Physical Anthropology* (Bulletin, United States National Museum, vol. 39, pt. R).

1920 *Anthropometry* (Philadelphia: Wistar Institute).

JARCHO, JULIUS

1933 *The Pelvis in Obstetrics. A Practical Manual of Pelvimetry and Cephalometry including Chapters on Roentgenological Measurement* (New York: P. B. Hoeber).

KNIGHT, EDWARD K. (ED.)

1874 "Calipers" (in *American Mechanical Dictionary*, vol. 1, p. 429: New York: J. B. Ford and Co.).

LEBON, GUSTAVE

1878 *Cephalomètre de poche, ou compas des coordonées permettant d'obtenir très-rapidement les divers diamètres, angles et profils de la tête, et de reproduire en relief un solide quelconque* (Bulletins, Société d'Anthropologie de Paris, ser. 3, vol. 1, pp. 121-134).

MARTIN, RUDOLF

1899 *Anthropometrisches Instrumentarium* (Correspondenz-Blatt de deutschen Gesellschaft für Anthropologie, Ethnologie, und Urgeschichte, vol. 30, pp. 130-132).

1914 *Lehrbuch der Anthropologie* (Jena: G. Fischer; see also 2nd ed., 1928, 3 vols.).

MATIEGKA, JINDŘICH

1921 *The Testing of Physical Efficiency* (American Journal of Physical Anthropology, vol. 4, pp. 223-230).

MAUREL, E.

1887 *Des méthodes de mensuration de la cage thoracique* (Bulletins, Société d'Anthropologie de Paris, ser. 3, vol. 10, pp. 345-361).

MEIGS, J. AITKEN
1861 *The Mensuration of the Human Skull* (North American Medical-Chirurgical Review, September, pp. 837-861).

MÉREJKOWSKY, C. DE
1882 *Sur un nouveau caractère anthropologique* (Bulletins, Société d'Anthropologie de Paris, ser. 3, vol. 5, pp. 293-304).

METTLER, CECILIA C.
1947 *History of Medicine* (Philadelphia: Blakiston Company).

MOLLISON, TH.
1907 *Einige neue Instrumente zur Messung von Winkeln und Krummungen* (Zeitschrift für Morphologie und Anthropologie, vol. 10 (3), pp. 489-499).

MONTAGU, M. F. A., AND J. C. TREVOR
1937 *Note on a New Sliding Calipers for Cranial Measurements, including Internal Diameters* (Human Biology, vol. 9, pp. 417-418).

MORTON, SAMUEL GEORGE
1839 *Crania Americana; or, a Comparative View of the Skulls of Various Aboriginal Nations of North and South America; to which is Prefixed an Essay on the Varieties of the Human Species* (Philadelphia: J. Dobson).

PRUNER-BEY
1865 *De la chevelure comme caractéristique des races humaines d'aprés des recherches miscroscopiques* (Mémoires, Société Anthropologique de Paris, ser. 1, vol. 2, pp. 1-35)
1868 *Deuxième série d'observations microscopiques sur la chevelure* (Mémoires, Société d'Anthropologie de Paris, ser. 1, vol. 3, pp. 77-98).

SCHMIDT, EMIL
1888 *Anthropologische Methoden. Anleitung zum Beobachten und Sammeln für Laboratorium und Reise* (Leipzig: Veit und Comp.).

SCHULTZ, B. K.
1937 *Taschenbuch der rassenkundlichen Messtechnik. Anthropologische Messgeräte und Messungen am Lebenden* (Munchen: Lehmann).

SCHWARZ, RUDOLF
1928 *Kraniometrische Technik* (Fortschritte der Zahnheilkunde, vol. 4, pt. 1, pp. 792-796).

SIGERIST, HENRY ERNEST
1951 *A History of Medicine. 1: Primitive and Archaic Medicine* (New York: Oxford University Press).

SMELLIE, W.
1752 *A Treatise on the Theory and Practice of Midwifery* (Reprinted, 1876-8 by Sydenham Society, 3 vols.).

STEVENSON, PAUL HUSTON
1929 *Adaptation of Hrdlička's Compass for Direct Head-height Measurements* (American Journal of Physical Anthropology, vol. 13, pp. 469-475).

STEWART, T. D.
1952 *Hrdlička's Practical Anthropometry* (4th ed., Philadelphia: Wistar Institute).

TOPINARD, PAUL
1885a *Éléments d'anthropologie générale* (Paris: Delahaye et Lecorsnier).
1885b *Procéde de mensuration des os longs, dans le but de reconstituer la taille* (Bulletins, Société d'Anthropologie de Paris, ser. 3, vol. 8, pp. 73-78).

VON TÖRÖK, AUREL
1890 *Grundzüge einer systematischen Kraniometrie* (Stuttgart: F. Enke).

VALLOIS, H. V.
1940 *Le laboratoire Broca (Laboratoire d'Anthropologie de l'Ecole pratique des Hautes-Etudes)* (Bulletins et Mémoires, Société d'Anthropologie de Paris, ser. 9, vol. 11, pp. 1-18).

WHITE, CHARLES
1799 *An Account of the Regular Gradation in Man and Different Animals and Vegetables from the Former to the Latter* (London).

WASHINGTON, D. C.

THE SINS OF THE FATHERS: CONCEPT OF DISEASE AMONG THE CANADIAN DAKOTA[1]

RUTH SAWTELL WALLIS AND WILSON D. WALLIS

DAKOTA, SANTEE SIOUX, OR ISANTI DAKOTA, live on four Reserves in western Manitoba. They are mainly descendants of Wapheton, Sisseton, and Mdewakanton who in 1862 rose up against the Whites in the Minnesota valley. A small number of the rebels crossed the Canadian border within a few months after the outbreak, were unwelcome squatters for years, and were given Reserves in 1875.

Our field work was carried out on two Reserves: Sioux Village, on the outskirts of Portage La Prairie, and Oak River, near Griswold: at both Reserves in 1914 and in 1951; at Griswold in 1952.

The belief that the sin—ritual or moral—of a parent or other ancestor brings sickness or bodily defect to a descendant while the sinner goes scot-free, appears to be rare. The item does not occur in Clements' list of causes of disease;[2] and our sampling of several ethnographic areas in various parts of the world has revealed few instances of this concept. Koppers states that among the Yamana of Tierra del Fuego a god "punishes the evil-doer, especially by making him die young, or making his children die in punishment for his misdeeds."[3] Redfield speaks of "the Tzeltal Indians of Chiapas, . . . a people often sick, always believing that each sickness was the result of some moral transgression committed by the sufferer or by some of his near kinsmen."[4]

Distribution of the belief that a specified sickness, bodily disability, or death is due to an act of commission or of neglect by the victim is virtually world-wide.

Nor is it unusual to find belief that the weakness and handicaps of a parent are inherited by descendants; so that, indirectly, the descendants suffer from the

1 The field work of Ruth Wallis, in 1952, was supported by a grant from the Wenner-Gren Foundation; that of Wilson Wallis by the Department of Anthropology and the Graduate School, University of Minnesota.

2 Forrest E. Clements, *Primitive Concepts of Disease* (University of California Publications in American Archaeology and Ethnology, vol. 32, no. 2, 1932).

3 William Koppers, *Primitive Man and his World Picture* (New York, 1952).

4 Robert Redfield, *The Primitive World and its Transformations* (Ithaca, 1953), p. 152, referring to Alfonso Villa Rojas, *Notas sobre le etnografia de los Indios Tzeltales de Oxchuc* (microfilm collection, Department of Anthropology, University of Chicago).

fault or failure of parents. "The fathers have eaten sour grapes and the children's teeth are on edge." "The sins of the fathers are visited upon the children to the fourth and fifth generation." The sentiment, however, does not imply that the visitation of a parent's fault shall take the form of illness; presumably punishment might arrive in any unfortunate guise.

We suspect, however, that absence of evidence may be partly attributed to failure to ask the direct question: What is the cause of disease? One recalls that at the beginning of this century there was, to our knowledge, no published information about joking relationships, and practically none about intimate friendships and comradeships: two institutions now known to be world-wide, though not tribally universal. Moreover, sins-of-the-father visited on offspring have been recorded for two tribes with which the Dakota have had contacts.

In 1914, one of us during four months of field work with the Dakota did not ask what caused disease, and did not meet with the concept of sickness caused by ancestral sin. In 1951, the question was asked on the first day of field work. The concept, then fully stated, was confirmed by seven additional informants, men and women. In no instance was there implication, direct or indirect, that the concept was of biblical or of missionary inspiration, or otherwise attributable to contact with Whites. The informants—two men and six women—ranged in age from 38 to 83, and represented various degrees of acculturation. One, an old man, was the sole non-professing Christian on the Reserve, the last living member of the Holy Medicine Society; one was a practising medicinewoman; another was the most consciously acculturated woman of her age-group (65); the youngest was a midwife who used modern medical technique.

Before the Whites came, the Dakota say, there was very little sickness. Sickness came to them only from the wrong-doing of a greatgrandfather and much still derives from that cause. Only a medicineman, a "doctor," can diagnose it. If he sees "things flying around the patient like smoke," he knows the cause is ancestral sin. He then smokes, sings, and in a vision sees the particular sin that caused illness in the innocent patient. The door of the house is opened, and a near relative of the sick person stands ready with a gun. The medicineman names the sin, the gun is fired, and the patient feels better at once, "because we know the cause."

Sins that cause illness in descendants are of at least three types: ritual transgressions, torture or mockery of animals, crimes against a person or against the group. The eight informants mentioned a total of fourteen cases: eight sins were ritual; three were against animals; three were social. All of the ritual sins named were positive: warriors participated in a ceremony or went on a raid while sexually

incontinent, or left bloody knives around the house to contaminate children; menstruous women broke taboos by touching, or stepping over, object or person. One ancestor had tortured an animal, and two women who had mocked at animals had defective offspring; two progenitors were murderers; a third, single-handed, started the Minnesota uprising.

Ideally, the guilty ancestor is, as stated above, a greatgrandfather; actually he may be a grandparent, and, though there is insistence that he can belong to no later generation, three informants said it could be a parent, and two of these gave cases in which father or mother committed the sin. A disease thus activated can continue through subsequent generations.

For example: The Pashe family suffer from bad headaches. Uncle George Pashe, a medicineman, went into a trance and named sinner and sin. His father, Pa'siapamani, a young warrior at the time of the Minnesota rebellion, brought with him from the States a captive White boy. His wife, who had a son of the same age, was jealous of the way her husband combed the little slave's hair and painted his cheeks, and said so, not just once. "Why don't you look after your own son instead of that White boy?" That made Greatgrandfather Pashe mad. He got up, took his gun, stood the little White boy in the entrance of the tipi, and shot him through the head. So now all four living generations of Pashe have headaches; but Greatgrandfather Pashe lived a healthy and extremely long life.

The Pashes have other troubles. When Uncle George, the medicineman and son of the old murderer, was a boy, he and his cousin skinned a live rabbit and let it run loose and cry until it died. "Now we Pashes have pains all over the body and skin trouble, because the rabbit's skin was torn and it suffered so." Uncle George, the sinner, lived to be eighty-eight.

A third Pashe, an aunt of the informant, had a baby who died in convulsions, leaving its eyes and mouth wide open. The day after its death the mother tried to close the mouth and put weights on its eyelids. Now all of her descendants have sore eyes and cannot half open them. For she was unclean. She had had sexual intercourse just before she touched the dead child.

Punishment does not always fit the crime as neatly as it does with the long-suffering Pashes. For example: A young man "all skin and bones, and passing blood in his urine," owed this condition to a grandfather who "wore eagle feathers when he was unclean," but no sympathetic connection between disease and offense was made by the informant, the medicinewoman who had sucked out and vomited up the feathers (so identified not by herself but by the patient's father). However, three of ten Dakota who in 1875 joined in a murder (to them an execution but not so interpreted by the Canadian government) bequeathed to sons and

grandsons the loss of an arm, poor vision, and blindness caused by a branch entering the eyes. The murderers are today accused of having broken the bones, and poked a stick, into the eyes, of their victim.

This group murder and its consequences to a bewildered people not accustomed to Reserve life and White law engendered great fear. "If a sin has been committed, some one has to pay." But not the informant: his father did not take part in the crime, as did Burt's, and Jim's, and Henry's fathers.

Recriminations over who started the trouble in Minnesota, common a generation ago among the Dakota, suggested other information about physical failure due to social sin. A man who, like the preceding informant, was the grandson of a "good" Dakota, said that the Pashe family line was dying out, and lacked the strength to survive because Old Man Pashe all by himself started the war in Minnesota. (Actually there are still a lot of healthy young Pashes.)

Sins not actually known to have caused illness were mentioned as potential sources. Mental illness is caused by "the worst sin of all." When asked whether the Dakota ever performed an autopsy, an informant exclaimed: "Cutting into a dead body like that would be the kind of sin for which future generations would suffer." Fear and resentment apparently are aroused whenever the subject is mentioned, although a few like to talk about it: "It seems unfair that we have to suffer because our old grandfathers did things like that." "This belief is very deep in our Dakota religion."

The intensity of this belief may have carried outside Reserve limits. Uncle George, according to the Pashe family informant, doctored White people as well as Indians, and in his visions saw the old sins of their families.

Two tribes within the Dakota area of contact have specific analogues to their belief of deferred illness caused by sin. Hilger reports of the Arapaho: "A murderer's children would never be healthy."[5] Hallowell indicates a clear instance of it among the Saulteaux: "When a man is young he may do something to cause his children trouble. They will suffer for this. Illness derived from this source is designated by a native term. Consequently if a child falls seriously ill, it is often attributed to the transgression of a parent."[6] Hallowell has recently written to us: "I do not believe that I have . . . a single case in which grandparents of any category were brought into the picture." The concept, again restricted to father and child, is mentioned among Comanche: a man who had killed a dog

5 Sister M. Inez Hilger, *Arapaho Child Life and its Cultural Background* (Bulletin, Bureau of American Ethnology, no. 148, 1952), p. 105.

6 A. Irving Hallowell, *The Function of Anxiety in a Primitive Society* (American Sociological Review, vol. 6, 1941), p. 873.

believed he had, in consequence "bad luck with his children. They all got sick and died."[7]

Within Dakota culture perhaps the closest approach to this concept was the conviction that if a man failed to follow instruction from a supernatural to perform a Sun Dance or some similar rite, the Thunders would kill his wife or the Buffalo Beings gore his child as a "warning."[8]

A striking case of an offense followed by immediate punishment visited on innocent kin is recorded by Charles A. Eastman who, as a Dakota child aged five, witnessed it in 1863:

> I . . . rejoiced to see the bigger boys industriously sharpen their arrows, resting them against the ends of the long sticks which were burning in the fire, and occasionally cutting a chip from the stick. In their eagerness they paid little attention to this circumstance, although they well knew that it was strictly forbidden to touch a knife to a burning ember.
>
> Suddenly loud screams were heard from without and we all rushed out to see what was the matter. It was a serious affair. My grandmother's axe had slipped, and by an upward stroke nearly severed three fingers of my aunt, who stood looking on, with her hands folded upon her waist. As we ran out the old lady, who had already noticed and reproved our carelessness in regard to the burning embers, pursued us with loud reproaches and threats of whipping. This will seem mysterious to my readers, but it is easily explained by the Indian superstition, which holds that such an offense as we had committed is invariably punished by the accidental cutting of some one of the family.[9]

In conclusion: The concept of sickness caused by an ancestor's sin seems to be deeply rooted in Canadian Dakota belief and to be universally accepted on the two Reserves studied. It is certainly not less emphatic among the least acculturated persons, a fact which suggests that the concept is aboriginal among Dakota or in some other group with which they have had contacts. We suspect that investigation would reveal its presence in nearby areas, for Arapaho and Saulteaux share it; and the Comanche example implies that the concept was widely held in Plains culture.

UNIVERSITY OF MINNESOTA
MINNEAPOLIS, MINNESOTA

---

7 Ernest Wallace and E. Adamson Hoebel, *The Comanche: Lords of the Plains* (Norman, 1952), p. 69.

8 Wilson D. Wallis, *The Canadian Dakota* (Anthropological Papers, American Museum of Natural History, vol. 41, pt. 1, 1947); see pp. 61, 80.

9 Charles A. Eastman (Ohiyesa), *Indian Boyhood* (Boston, 1930), p. 31.

VESSEL-LIP DECORATION AS A POSSIBLE GUIDE TO SOUTHWESTERN GROUP MOVEMENTS AND CONTACTS

BRUCE T. ELLIS

DURING the entire known course of Southwestern Indian ceramics, the lips of painted bowls and jars have been finished in but four different ways, or styles. Although mention of these appears in some published descriptions of pottery types,[1] no detailed study of lip-treatment has ever been made, probably because the subject has been viewed as insignificant in comparison with other ceramic traits. In a cursory survey of the distribution of lip-treatment styles on both modern and prehistoric pottery, however, the rough pattern assumed by much of the resultant data seemed suggestive enough to warrant a fuller investigation. In attempting this, not only has a surprisingly consistent relationship between the different lip-treatment styles and various complexes of other ceramic traits shown itself, but development along both geographical and chronological lines has become evident. It is possible, therefore, that this single, seemingly minor trait may be a supporting—or even in some cases a guiding—factor in enquiry into the movements and contacts of peoples or complexes within the Southwest.

The four styles are:

(1) Striping, with either black or red paint;

(2) Ticking, or embellishing with a checkered, double-linear or other open design, in black and occasionally white paint;

(3) Red-slipping, in a slip distinct from that of the decorative zone, either as a stripe lying directly upon the lip or as an overlap of a band or total covering of red slip on either surface, drawn up to and over the lip;

(4) Leaving the lip undecorated. It may be either covered with body-slip or left "in the paste."

(A seeming fifth style occurs when parts of the surface patterning overlap

1 Many of the published descriptions of the 260-odd Southwestern painted pottery types thus far listed ignore lip-treatment, while others lack clarity on the subject because of indiscriminate use of the terms "rim" and "lip." Mention of a "rim-line" often leaves it doubtful whether the line is on the vessel's lip or just below it. Kidder differentiates between "rim" and "lip" by defining the former as "that part of a vessel which adjoins the orifice," and the latter as "the terminal edge of the rim" (A. V. Kidder and A. O. Shepard, *The Pottery of Pecos*, New Haven, 1936, vol. 2, p. 4, fn. 1).

the lip. The rare instances of this cannot be considered as deliberate attempts at lip decoration.)

Few pottery types make exclusive use of any one or the other of these four styles. Preponderant usage of a single style with a type is common, however, and this preponderance also extends over many entire wares, or groups of apparently related types. Of greater significance, perhaps, is the fact that a division of the four styles into two great and (in the main) mutually exclusive usage-groups is evident. The paint-striped lips on the one hand and the plain, ticked, and red-slipped lips on the other seem to mark two different Southwestern ceramic traditions.

Although priority in Southwestern painted wares is generally given to the Hohokam paddle-finished red-on-buff ware of south-central Arizona, it is by no means certain that a southern Mogollon type (scraped-finished, red-on-brown) of southeastern Arizona was not at least as early. Both, it appears at present, preceded the first Anasazi painted pottery, which was scraped-finished and black-on-white (or gray), and at the apparent time of its origin in the San Juan was separated from both of the southern painted-ware areas by a broad territory in which nothing but plain brown and plain red pottery was being produced.

Lips of many of the earliest Mogollon decorated vessels were painted red. The trait is not as noticeable on the first Hohokam painted types, but is prominent on later examples. In general, it is a common feature of the painted brown-wares wherever they appear in the Southwest—on the Mogollon line, stretching east across southern New Mexico and north to the upper Gila, and the Hohokam types and their relatives west from the Gila and Salt River valleys to a possible merging with Yuman types on the Colorado and north from the Salt up the Verde valley to the Flagstaff area. And on Abajo Red-on-Orange, Anasazi-made with Mogollon firing-methods in the San Juan *circa* 700 AD, vessel-lips are almost invariably red-painted.

Of Hohokam lips in general, Amsden wrote:

> Rims (meaning the very edge of the vessel), commonly show some painting. Often it is an overflow of the patterning, which always begins at the very brink. Sometimes the base-line of a quartered or banded layout will be drawn so near the rim as to smear that part fairly evenly with paint—but whether intentionally, it is hard to say. In many vessels, one is sure that the rim was deliberately painted if only to consolidate the smears already made on it. This pother over a small point really has its roots in the fact that Hohokam rims are so indecisive in character, thin and wavering as they usually are, that the decorator apparently considered them merely a limit to her brush rather than a factor of form or an area worthy of any separate

effort. *The potter was not rim-conscious, as the Pueblo potter so often was,* and the decorator (presumably the same person) had no neatly smoothed edge on which to exercise her delicate skill.[2]

The italics are mine. It is possible, as Amsden suggests, that the Hohokam vessel-lip was painted merely to provide a neat selvage for the surface patterning, but it is doubtful that the flimsy structure of the lips had much to do with the matter. Lips of the earliest dated Anasazi mineral-painted bowls yet found, made possibly *circa* 600 AD, in the Four Corners area, were even thinner and more wavering than were those of Hohokam vessels, yet they were striped (black) at least as commonly as Hohokam lips were red-striped. This frequency increased on mineral-painted Pueblo I[3] black-on-whites, still thin-lipped, until on local varieties of certain types it has been reported at almost or fully one hundred percent.[4]

On other evidence than compared use-frequencies it is plain that lip-striping soon became a much more positive trait in the north, or more precisely, in the northeastern Pueblo area and on pottery styles disseminated from that area, than it had ever been in the south. Three circumstances attest this:

(1) Although some southern brown-ware lip-stripes may have served merely to finish off the surface patterning, all Anasazi examples were obviously not limited to that purpose. On some P II and many P III black-on-whites, the surface patterning was framed at the top by one or more lines encircling the vessel-wall just below the lip. In such cases, however, the lip itself continued commonly —on some types invariably—to be striped.

(2) On many types the lip-stripe was broken by the "line-gap" or "ceremonial break."[5] This was the earliest position of the "break," first definitely noted on early P II Chacoan black-on-whites. Its occurrence in lines or bands below the

---

2 C. A. Amsden, *An Analysis of Hohokam Pottery Design* (Medallion Papers, Gila Pueblo, no. 23, 1936), pp. 25-26.

3 Periods and specific pottery-type colors will hereinafter be abbreviated as follows: Basketmaker (II, III)–BM (II, III); Pueblo (I to V)–P (I to V); Black-on-White–B/W; Black-on-Gray–B/G; Black-on-Red–B/R; Black-on-Cream–B/C.

4 For Kiatuthlanna B/W: F. H. H. Roberts, Jr, *The Ruins at Kiatuthlanna, Eastern Arizona* (Bulletin, Bureau of American Ethnology, no. 100, 1931), p. 131; H. S. Gladwin, *The Chaco Branch* (Medallion Papers, Gila Pueblo, no. 32, 1945), p. 41. For Piedra B/W: F. H. H. Roberts, Jr, *Early Pueblo Ruins in the Piedra District, Southwestern Colorado* (Bulletin, Bureau of American Ethnology, no. 96, 1930), p. 135. For White Mound B/W: Gladwin, *op. cit.*, p. 23. For Red Mesa B/W: Gladwin, *op. cit.*, p. 56.

5 K. M. Chapman and B. T. Ellis, *The Line-Break, Problem Child of Pueblo Pottery* (El Palacio, vol. 58, no. 9, pp. 251-289, 1951).

lip was a later development of P III and especially P IV times. Lower encircling lines on the early types were never broken; on these types it is obvious that only the lip-stripe was of peculiar significance to the potter, requiring special attention.

(3) The only general distinction between the two earliest known Anasazi painted pottery types is that the pigment of one (La Plata B/W) is basically mineral in substance while that of the other (Lino B/G) is wholly vegetal.[6] Both types have been found together in a few BM III sites in the central San Juan, within a radius of fifty miles of the Four Corners. Lino alone, however, occurs throughout the broad BM III area west and southwest of this district, while in a more limited area to the east, southeast, and south mineral-painted La Plata prevails. Most of the scanty BM III excavation and site-dating has been confined to the Four Corners district; the relative ages of the general run of "pure" Lino sites in the west and "pure" La Plata sites in the east have not yet been determined.[7] The point has a bearing on the present subject, as it is in this east-and-west split in paint-types that the third indication of the lip-stripe's positive character in the north becomes apparent. Although it has been uncertainly reported on a few Lino specimens from mixed Four Corners sites as well as on BM III "Glaze," it is not found on western Lino. It is prominent on La Plata, however, and throughout the entire black-on-white dual-paint development which followed these two earliest recognized types, from P I into the historic period, it was associated only with mineral-painted pottery.

The lip-stripe was common—in some cases invariably used—on the early BM III, P I, and P II black-on-whites which spread thinly over northeastern New Mexico and down the Rio Grande valley to below present Socorro, where they began to meet plain brown-ware of the eastern Mogollon extension noted above. The development of these eastern black-on-whites reached its best-known stage in the Chaco area *circa* 1000 to 1100 AD. Considerably before this, however, so-called Chacoan ceramic influence had begun to move south and southwest

6 Because of lack of published data, the BM III "Glazes" from the La Plata and Animas valleys of southwestern Colorado, employing lead ore in a vegetal flux or binder (E. H. Morris, *Archaeological Studies in the La Plata District, Southwestern Colorado and Northeastern New Mexico*, Publication, Carnegie Institution of Washington, no. 519, 1939, pp. 258-260), have not as yet been pinned down by Southwestern taxonomists. Dates from the Durango district thus far released would make it appear that "Glaze" is very early in the history of San Juan painted pottery—but usage of the relatively complicated glaze formula would also make it seem probable that it was not the first ceramic paint employed in the area.

7 In view of the focussed knowledge of ceramic antiquity in the Four Corners area which has resulted from the clustering of dated and published excavations in that area, it should be emphasized that there is as yet nothing in the western Lino B/G picture which would preclude its being at least as old as either Lino or La Plata in the Four Corners or as La Plata in the east.

towards the Little Colorado and the upper Gila. Chacoan design elements are clear on the mineral-painted black-on-whites which developed in the east-central Arizona and west-central New Mexico area from P I through P III—but so also are features of both Mogollon brown-wares and P I and II vegetal-painted western Anasazi black-on-whites which, succeeding Lino and then Kana'a, began their distinctive styling with Deadman's and Dogoszhi. From the Kayenta down past the San Francisco Mountains on the west and the Chuskas on the east, these western black-on-whites had carried the plain vessel-lip south towards the Mogollon Rim while the eastern iron-painted types were expanding south to the Little Colorado and beyond. Elements of the two wares mingled all along the juncture of their southerly drift. The black-on-whites which were produced by this mingling in the Little Colorado, Zuñi-Acoma, White Mountain, and upper Gila area, although for the most part retaining iron paint as their medium, show great heterogeneity in lip-treatment. The black stripe is present on some specimens of all of the mineral-painted types, but on most types it is rivalled or even decidedly surpassed by both the undecorated lip and a third style—ticking.

Loss of dominancy by lip-striping in its southward course is clearly shown in the Acoma area, which although geographically nearer the Rio Grande ("pure" eastern mineral-paint territory) than the Little Colorado, is culturally tied to the latter. It will be remembered that "type" finds of early mineral-painted White Mound, Kiatuthlanna, and Red Mesa Black-on-Whites in the north were reported as one hundred percent lip-striped. The same types recently found in the Acoma district show White Mound to have both plain and striped lips, Kiatuthlanna striped and ticked lips about equally, with plain lips rare, and Red Mesa more ticked than striped lips with plain lips more common than on Kiatuthlanna. Lips of mineral-painted Cebolleta Black-on-White, dominant in the area perhaps *circa* 1000 AD, are only about ten percent striped, the remainder being equally ticked and plain. In its eastern range Socorro B/W (perhaps 950-1200 AD) is predominantly lip-striped, but Socorro in the Acoma district seems to be not only longer-lived but to copy the design features of the more transitory local types through the life-spans of which it persisted.[8]

On only one of the black-on-whites from south of the Little Colorado is black lip-striping dominant, and that is on the very southernmost—Mimbres. Here the striped lip may have an unbroken ancestry back to a southern brown-ware source; northern influence, while developing Mimbres Bold-face out of Three Circle Red-on-White through a change of firing method and some design fea-

8 Acoma data from A. E. Dittert, Jr, personal communication, 1953.

tures, could only reinforce the already existing paint and lip-treatment traditions of the Mogollon series. In its later phase Mimbres B/W possibly carried the black lip south to its usage on certain Chihuahua polychromes, whence it might have been picked up by Babicomari Polychrome in southeastern Arizona (*circa* 1200 to possibly 1450 AD), its last prehistoric appearance in Arizona.

In the "pure" eastern mineral-paint area it was also the southernmost pottery types which carried black-striping farthest in time. As above noted, early Mogollon red-on-browns of southern New Mexico—extending east of the Rio Grande—had borne red-painted lips. In the Jornada district the development of Lincoln B/R out of Three Rivers Red-on-Terra Cotta changed the lip-stripe to black and continued it in the area to *circa* 1400 AD, when the type (and its characteristic black lip) were lost in a southern variant of Rio Grande Glaze. On the sole important black-on-white type of the southeastern district, however—Chupadero, beginning *circa* 1150 AD—the black lip was carried as a common feature well into the historic period, lasting on a local variant—Tabira—as late as *circa* 1650. It was the only mineral-painted black-on-white of the entire Pueblo area to thus survive; in the east the others had vanished by 1300 and the last western example a century later.

A notable distinction in regard to lip-striping lies between the two groups of mineral-painted black-on-red and polychrome types which occur in the northeast and the east-central sectors of Arizona. On the first (San Juan Red and Tsegi Orange wares),[9] which accompanied the plain-lipped vegetal-painted black-on-whites discussed above as a possible off-shoot development of Abajo, both black (on black-on-red and polychrome) and red (on polychrome) lips are frequently found. Solidly striped lips of either color, however, are never present on either the black-on-reds or later polychromes of the more southernly district—the important White Mountain and Little Colorado types which ultimately passed into Glaze. In this group plain lips are the rule, although ticking is common or standard on some types. This lip-treatment diversity between the northern and southern red-ware groups, and the limitation of northern red-ware production to the western San Juan area in which vegetal paint was standard on black-on-whites, will be discussed more fully later.

A single exception to the early prevalence of mineral-painting and lip-striping on black-on-whites in the eastern area is found in the Gobernador and the Largo-Gallina country of northwestern New Mexico. In the Gobernador, vegetal-painted vessels predominate in late BM III-P I Rosa B/W. Striped lips are rare, most

9 H. S. Colton and L. L. Hargrave, *Handbook of Northern Arizona Pottery Wares* (Bulletin, Museum of Northern Arizona, no. 11, 1937), pp. 67 and 92.

vessels being plain-lipped.[10] Gallina B/W, the possible lineal descendant of Rosa somewhat to the southeast *circa* 1050-1300 AD, is vegetal-painted and mainly plain-lipped. Ticking is present, but never black-striping. Still farther to the south and later in time, vegetal-painted Jemez B/W (beginning *circa* 1300 AD) shows certain design similarities to Gallina and carries both the plain lip and the ticked variety well into the historic period.

The almost total submergence of mineral-painted black-on-whites (and consequently of lip-striping) at about the end of the fourteenth century was due to two factors: (1) the swing to vegetal paint in the Four Corners area *circa* 1000 AD and its later spread from this center south and southeastward over most of the former mineral-paint territory of northern New Mexico, and (2) the development of Glaze in east-central Arizona out of the southern redware group noted above, and its subsequent expansion eastward to the middle Rio Grande. A third ceramic change at about the same time or slightly earlier—the replacement of (for the most part) vegetal-painted black-on-whites in the Hopi area by an iron-painted red or yellow-slipped series—merely substituted the plain lip of the latter for the plain or occasionally ticked lip of the earlier black-on-whites. The new yellows did not use the black (or red) lip-striping which had appeared in the northern red-ware group of the same general area—a circumstance which helps support the theory that the new wares probably stemmed from the Little Colorado and Salado lines, rather than from those of the Tsegi-Kayenta district.

Present data can supply only a rough outline of paint-type distribution and changes through P I and II in the Four Corners area, especially on the Mesa Verde. In early P I, mineral paint seems to have become dominant. Black-on-white designs throughout the area grade through other variants of early Chacoan types into Mancos (*circa* 850-1100 AD). Mancos vessel-lips, however, fail to follow the early eastern mineral-paint pattern in that they are as likely to be undecorated or ticked, as black-striped.

Possibly towards the end of P I vegetal painting reappeared in the area, with design-types indicating strong influence from the Kayenta to the west although Chacoan and more southerly effects are also evident. First represented by the loosely defined (and by some authorities unrecognized) McElmo B/W, vegetal-painted vessels became standard and achieved classic form in Mesa Verde B/W *circa* 1150-1300 AD. On McElmo, lips were either undecorated or ticked, whereas ticking was practically always used on classic (late P III) Mesa Verde. Neither type made any use of striping.

10 E. T. Hall, Jr, *Early Stockaded Settlements in the Governador, New Mexico* (Columbia Studies in Archaeology and Ethnology, vol. 2, pt. 1, 1944), p. 36.

Until its characteristic use on Mesa Verde B/W, ticking was an extremely unstable trait. As previously noted, it is reported on mineral-painted Chacoan types in the Acoma area which should date at least as early as Mancos. Slightly later it was occasionally used on Tularosa, Roosevelt, Snowflake, and other iron-painted black-on-whites of the Southwestern Pueblo area, and in the southeast it sometimes replaced the solid lip-stripe of Chupadero. Still later, and less frequently, it was used on the few mineral-painted black-on-whites scattered in the predominantly vegetal paint territory of the northwest. It makes very rare appearances on southern (as opposed to San Juan) black-on-reds, and is found on Tonto and Four-mile Polychromes, commonly on the latter. The western (Kayenta) vegetal-painted black-on-whites seldom show it, whereas on Gallina in the eastern sector it finds appreciable use, although much less than does the plain lip. This last type seems not only to refer back to Rosa, as noted above, but also to show some Mesa Verde influence.

Southward and southeasterly migrations from the Mesa Verde during the thirteenth century have been postulated. Just how much of the Mesa Verde influence that is shown in the various vegetal-painted pottery types which developed in northern New Mexico between *circa* 1200 and 1550 AD is due to actual movements of peoples is a matter of debate. This influence appears most clearly, perhaps, on vessels from sites on the upper Puerco, west of Mt Taylor, and south in a straggling line towards the Datils. Evidently late (as indicated by cross-finds), the southernmost extension seems to have disappeared without affecting local ceramics. From the northern Puerco, however, the near-typical Mesa Verde strain may have branched eastward into the Rio Grande valley and the Galisteo Basin. Other Mesa Verde influence through Gallina B/W has been suggested as appearing in the Santa Fe B/W of this area and up the Jemez.[11] However direct or indirect their ties to the Mesa Verde country may have been, the Santa Fe, Galisteo, Jemez, Wiyo, and Biscuit vegetal-painted Black-on-Whites usurped all of the former thinly settled upper and part of the middle Rio Grande mineral paint territory. Only in the south, in a broad arc swinging southeastward from below Mt Taylor on the west, across the Rio Grande as far as the Pecos, did iron-painted pottery survive.

All of these vegetal-painted types bore plain and ticked lips only. Galisteo B/W was brought to an end in the fourteenth century by the expansion of Glaze in the Middle Rio Grande and the Galisteo Basin. Some Glaze seems also to have been made (although much was imported) on the upper river and its

11 H. P. Mera, *Ceramic Clues to the Prehistory of North Central New Mexico* (Bulletin, Technical Series, Laboratory of Anthropology, no. 8, 1935), pp. 9 and 11.

tributaries, but the vegetal-painted series of this northern area (Santa Fe, Wiyo, and the Biscuits) withstood the assault of the new ware until about 1500 AD. Even then, the capitulation of Biscuit B was slow and never complete; although the oxidizing firing of Glaze gradually replaced the reducing firing of Biscuit, the use of vegetal paint was successfully continued under the new method which, with other changes, produced Sankawi B/C. Plain and ticked vessel-lips continued on this new type until some time in the 1600's, when another Glaze feature was added. This was red slip, at first tried on various parts of the vessel-rim but soon applied as standard practise (on jars) to the lip, the inner rim-surface, and the base. The duo-slipped type thus formed has been termed Tewa Polychrome.[12]

Essentially, the red-slipped lip is the result of the northern black-on-white style of decoration being applied to a southern redware vessel in the form of either a band or a total interior or exterior surface covering of white slip as a base for black decoration, leaving the lip and often the base of the vessel in red. This type of duo-slipped polychrome was first produced in the Salado area of south-central Arizona about the middle of the twelfth century. On the Salado polychromes (Pinto, Gila, and Tonto) the action of northwestern rather than northeastern influence upon the basic southern redware is suggested by the fact that the black used on the white body-slip was a vegetal pigment. On no other pottery of the Southwest was the same combination of vegetal paint, red and white slip, and oxidizing firing used until Tewa Polychrome was born, *circa* 1650 AD in the upper Rio Grande.

The Salado types lasted to possibly 1450 AD. Spread far from their points of origin in the Gila and Tonto basins they have been found south in Chihuahua, north in the Little Colorado and Zuñi country, and east across southern New Mexico and in western Texas.

---

12 The development of Tewa Polychrome (named by H. P. Mera, *Style Trends of Pueblo Pottery, etc.*, Memoirs, Laboratory of Anthropology, no. 3, 1939, p. 12) out of Biscuit-plus-Glaze was suggested by A. V. Kidder (*The Pottery of Pecos, Vol. 1*, Papers, Southwestern Expedition, Phillips Academy, 1931, p. 161) and Mera (*op. cit.*, pp. 9-12). The theory finds support in the results of excavations by the Laboratory of Anthropology at Cuyamungue and the University of New Mexico at Pojoaque, both in the summer of 1952. A gradation of sherds from pure Biscuit B through "Biscuit-Sankawi," Sankawi B/C, and "Sankawi-with-Red" to a recognizable Tewa Polychrome was found at each site, both of which are in the Tewa area north of Santa Fe. A direct genetic line for vegetal paint usage in this northern area thus seems indicated—but it is not certain that all of the so-called "Tewa" types found farther south, although vegetal-painted, are derived out of Biscuit and Sankawi. Neither Kidder's geometrically designed "Modern Painted" jars found at Pecos (*op. cit.*, pp. 147-148; fig. 87c, d) nor Mera's "Aberrant Ogapoge" specimens (*op. cit.*, pls. 27 and 28) are "Tewa" in form and decoration.

About 1300 AD the practise of white (or light-colored) body-slipping was picked up by Glaze. The technique of the earliest Little Colorado Glaze (*circa* 1200 AD)—basically a black-on-red with glaze paint substituted for matte mineral black—either through trade or eastward emigration, reached the middle Rio Grande in the first quarter of the fourteenth century. In both the western and eastern areas light-slipping at first found many experimental uses, but about 1450 AD it began to assume the same standard form on Glaze which had been one of the Gila Polychrome styles—on jars a broad encircling band, leaving the lip and usually the base in red, and on bowls a total covering of the interior. It is reported thus on a late Pecos Glaze II jar,[13] finds increased use on Pecos Glaze III, and becomes almost standard on IV (dark-slipped) and V.[14] Lack of published data on the late western (Zuñi) Glazes prevents checking the reasonable assumption that in this area the progression was similar to that in the east.

The first Glaze, developing as it did from Little Colorado black-on-red which made no use of the black-striped lip, likewise failed to employ the feature.[15] It was also not used on the later, light-slipped Glaze types, either western or eastern.[16] It has been suggested that the earliest eastern light-slipped Glaze was invented in the Galisteo Basin when potters of the area applied imported glaze paint and firing techniques to their native Galisteo B/W, a vegetal-painted type.[17] That both the eastern and the virtually contemporaneous western glaze-on-whites (or yellows) were ultimately derived from the partial white-slipping of Gila Polychrome, intrusive in the Zuñi area, should also be considered. Wallace Polychrome, a Zuñi area Glaze of *circa* 1300 AD, copies the Gila red exterior, white (with black decoration) interior slipping pattern of bowls, and this same pattern is followed a few years later by San Clemente Glaze-Polychrome (a Glaze A variant) in the middle Rio Grande, fifty miles southwest of the Galisteo Basin.[18] Some examples of early Galisteo light-slipped Glaze itself show red on bowl exteriors. It would thus appear possible that Galisteo all-over light-

13 Kidder and Shepard, *The Pottery of Pecos*, fig. 71a.

14 *Idem*, pp. 117, 168, 222.

15 One reason for this, aside from tradition, might be the annoying probability that a glaze-coated vessel-lip would fuse to the supports of the inverted vessel in the firing-process.

16 Its possibly accidental appearance on some late Glaze rim-sherds from middle Rio Grande and lower Manzano sites will be discussed farther on.

17 E. K. Reed, *The Tewa Indians of the Hopi Country* (Plateau, vol. 25, no. 1, 1952), pp. 14, 18.

18 H. P. Mera, *A Proposed Revision of the Rio Grande Glaze Paint Sequence* (Bulletin, Technical Series, Laboratory of Anthropology, no. 5, 1933), p. 4.

slipping developed from this eastern extension of the Gila duo-slipped pattern, which was probably also the ultimate model for Hawikuh Glaze-on-White in the Zuñi area, an all-over white-slipped type which had no local matte black-on-white as an immediate predecessor.

In any case and whether in the eastern or the western areas, there was no more reason for black lip-striping to appear on light-slipped Glaze than on the earlier Glaze-on-red. Neither Gila Polychrome nor Galisteo B/W had borne the trait.

Glaze flourished until *circa* 1600 AD. During the next century it underwent a process of disintegration, marked in the east by an increasing and apparently uncontrollable fluidity of the paint. Certain rim-sherds of the period show lips covered with glaze; some of these are obviously bad cases of surface-patterning "run-overs," while others seem to indicate deliberate painting of the lips. No whole vessels with lips entirely covered are known,[19] and it is of course possible that all of the glaze-lipped sherds in collections are from partially glazed rims. Sherds of this type have been found on early historic middle Rio Grande sites and also in ruins of the Manzano pueblos, abandoned in the late seventeenth century. In the more southern of these latter, late Glaze has been found accompanied by sub-types of Chupadero B/W, noted above as being the only prehistoric pottery type to project the black lip into the historic period.

Eastern Glaze ceased to be made in the first half of the eighteenth century. The succeeding "Tewa" matte paint variants progressed through an as yet vaguely known development which ultimately[20] split into the modern or recent styles of San Ildefonso, Tesuque, Cochiti, and Santo Domingo pueblos. The first two are of Tewa speech, the second Keresan. On the black-on-cream types of San Ildefonso and Tesuque (the dominant last domestic-use types, preceding the commercially-inspired vari-colored wares of recent years) vessel-lips continued to be red-slipped as they had been on the northern "Tewa" line. Cochiti and Santo Domingo Black-on-Creams, however, although vegetal-painted like those of their northern neighbors, show lips predominantly black—and occasionally on Santo Domingo and almost invariably on Cochiti broken by the "line-break." These two are the only modern pueblos to use the "break" in its original P II Chacoan

19 Comparatively few whole specimens of either late Glaze (post-1600) or early matte polychrome have survived, due to the Spanish clergy's discouragement of the prehistoric Pueblo custom of burying pottery with the dead.

20 Perhaps between 1800 and 1875 in general; estimates for the different pueblos should probably be separately made. Less is known about Pueblo pottery of the eighteenth and the first three quarters of the nineteenth centuries than of almost any other period. See footnote 19.

form, all others (when they use it) placing it in encircling lines below the lip or rim.

From below Santo Domingo (or more probably from below San Felipe[21]) in the Rio Grande valley to the Albuquerque area, and up the Jemez valley to beyond Zia, Glaze was followed by a coarse, heavy, matte mineral-painted polychrome which bore no resemblance to "Tewa." Termed "Puname Polychrome,"[22] its similarity in design, finish, and most typical form to nineteenth century Santa Ana Polychrome could indicate its lower Jemez valley origin, although some of its principal design characteristics are also found in Zia Polychrome, made farther up the valley. It seems definitely ancestral to both modern types, its strain in Zia being considerably modified by a fineness of both execution and styling which the up-river Keresans may have acquired from their close cultural relatives at Acoma, to the southwest. Neither the beginning nor the end dates of "Puname," as such, are yet known. Although the lips of all "Puname" specimens in the Laboratory collections are red-slipped, black-striped lips occur on "Puname"-like sherds found by Kidder at Pecos.[23] All modern Zia Polychrome vessel-lips are black-striped, and of Santa Ana specimens in the Laboratory collections (pottery-making was virtually discontinued at this pueblo in the early 1900's) about two-thirds are black-lipped, the rest being either red-slipped or left in the reddish paste. Like "Puname," both Santa Ana and Zia Polychromes are mineral-painted. All of this could indicate that the immediate matte-polychrome successor to Glaze in the lower Jemez continued Glaze's red-slipped lip for a while, later acquiring (like Santo Domingo and Cochiti?) black-striping, probably from the west.

Almost nothing is known about eighteenth and nineteenth century Jemez pottery. A survival of vegetal-painted Jemez B/W to *circa* 1750 AD has been indicated by tree-ring dating.[24] Production of a matte polychrome with a continuation

21 No painted pottery has been made at San Felipe, Santo Domingo's Keresan neighbor a few miles to the south, for many years, and none is documented as of such origin in the collections of the Laboratory of Anthropology, at Santa Fe. Elderly residents of the pueblo, however, assert that their grandmothers did make such pottery, and I have seen specimens which, although much like old Santo Domingo products, were said to be of San Felipe manufacture. Excavation of the trash-mounds of the pueblo could supply sherds from which a San Felipe "type"—perhaps differing from Santo Domingo in temper, form, and certain design characteristics—might be ascertained. Such excavation, however, or even the gathering of surface sherds, is strictly forbidden.

22 Mera, *Style Trends of Pueblo Pottery*, p. 18.

23 Kidder and Shepard, *The Pottery of Pecos*, p. 379.

24 Paul Reiter, *The Jemez Pueblo of Unshagi, New Mexico, Part II* (Research Monographs, University of New Mexico and School of American Research, vol. 1, no. 5, 1938), p. 178.

of this type's vegetal black paint may have overlapped the last few decades of both Glaze and Jemez B/W in southern Jemez area and have superseded both in the eighteenth century; if so, it was never prominent and has long been extinct. A possible example in my possession—a basalt-tempered, vegetal-painted, tall-necked olla found at Jemez—bears a red-slipped lip. Poorly documented "Jemez Polychromes" in the Laboratory collections are mineral-painted, sand-tempered, and black-lipped. In design and form they have a Zia appearance, and date possibly in the early 1900's. As a pueblo craft, the making of painted-before-firing pottery at Jemez has been dead for several decades.

In the Zuñi district, a matte polychrome seems to have broken the solid front of Glaze even before the coming of the Spaniards. Its complete description has not yet been published. Its use extended into the historic period, when Glaze reappeared in a decadent form somewhat paralleling the late Rio Grande variety. It lasted until possibly 1750 AD, when a matte mineral-painted polychrome (the continuation of the earlier type?) became standard both at Zuñi and at the two westernmost Keresan pueblos—Acoma and Laguna.

Although a single type-name—"Ashiwi Polychrome"[25]—has been applied to this western post-Spanish matte polychrome, the diversity of its design styles puts the use of a single label to considerable strain. Two of the styles would seem to relate to nineteenth century decorative schemes of Zuñi on the one hand and Acoma and Laguna on the other. Which is the older is unknown; of surviving whole specimens from the two areas few if any are accurately datable, and comparative sherd-dating has not yet been done. The late prehistoric use of matte-polychrome in the Zuñi district, however, makes it likely that "Ashiwi" originated there.

Examination of all "Ashiwi" specimens in the Laboratory collections indicates that the red-slipped lip of Glaze was used at the beginning (it appears on a few seemingly older vessels) but was superseded at an unknown but probably early date by black-striping. Zuñi-type sherds from Pecos (1780?-1838)[26] are black-lipped. All modern (or recent) Zuñi Polychrome vessels carry the trait, as do also the painted types of Acoma and Laguna, the latter two almost indistinguishable in design.

Hopi types of the Mission or post-Spanish period are inadequately described in the literature, although collections exist in eastern museums. It would appear that even in pre-Conquest times there was considerable interplay of design influ-

25 Mera, *Style Trends of Pueblo Pottery*, p. 20.
26 Kidder and Shepard, *The Pottery of Pecos*, pp. 376-377.

ences between the Hopi and Zuñi districts; the Hopi "feather motif" is prominent in the late Hawikuh Glaze and matte paint series, and features of this series and the "Ashiwi" type—including both red and black vessel-lips—appear on contemporary Hopi vessels. Late Glaze designs from the Rio Grande at the end of the seventeenth century may also have had some effect in the red-striping of Hopi vessel-lips of the period. The mixed and largely degenerate styling of nineteenth century Hopi pottery was finally brought to an end in the early 1900's by the revival of classic Hopi Yellow (mainly prehistoric Sikyatki Polychrome) patterning started by Nampeyo in 1895. Outside (Zuñi and possibly Rio Grande Tewa and Tano) influence is still visible in the otherwise faithful modern use of the Sikyatki style in the indiscriminate use of red, black, and plain vessel-lips.

To recapitulate, the paints and dominant lip-treatment styles of principal domestic painted pottery types of the modern pueblos are:

San Ildefonso B/C	(Tewa)	Vegetal paint	Red-slipped lip
Tesuque B/C	"	"	" "
Cochiti B/C	(Keresan)	"	Black-striped lip, with "line-break"
Santo Domingo B/C	"	"	Black striped lip, often with "break"
Santa Ana Poly.	"	Mineral "	Most lips black-striped; some (earlier?) red-slipped
Zia Poly.	"	"	Black-striped lip
Acoma (and Laguna) Poly.	"	"	" "
Zuñi Poly.		"	" "
Hopi Poly.		"	Lips black or red-striped, or undecorated

DISCUSSION

It is probable that lip-striping was a feature of southern red-on-brown pottery before any Anasazi fired vessels were made. That the earliest Anasazi fired type was a plain gray also appears likely—and that this plain gray-ware resulted from Basketmaker fumbling with a Mogollon plain brown-ware technique reported from below the border of the San Juan country has often been suggested. Experiments by Shepard[27] and references by other investigators point up the possi-

27 Morris, *Archaeological Studies*, pp. 263-265.

bility that the Basketmakers, confronted with the idea of hardening clay vessels by firing them, may have adapted their already existing bake-pits or ovens to this purpose, thus initiating the northern reducing firing process.

Given a plain gray-ware, the Basketmakers—whose instinct for decoration led them even to weave the thick under-sides of their sandals in pleasing geometric patterns—would certainly soon have found a means of relieving its drabness. It is not known whether the first black paint which they used was vegetal or mineral in substance—and it probably never will be known how much they were indebted to outside (southern) influence for the latter variety. Their own early invention of vegetal paint (unknown until much later in the south) seems likely; they had long been using vegetal stains in basketry decoration,[28] and a pottery bowl was much like a basket in function and form, and the two even had certain similarities in method of construction. The idea of transferring the angular designs of coiled basketry to bowls would not have been unnatural to a people capable of painting basketry designs on both sides of woven bag-fabric in imitation of basketry weave, even if one side was to be invisible inside the bag.[29] If painted in vegetal stain on a fired bowl interior, these designs would have been faint at best and would have lasted only until the bowl was used. How the stain first came to be applied before firing is of course conjectural, but it was undoubtedly soon found that almost any kind of vegetal stain would come out black—or at least blackish—from an oxygen-reduced firing.

The resemblance of not only Lino but also La Plata and Abajo bowl designs to those of BM II and III coiled baskets has often been noted, and the further suggestion has been made that the black lip-stripe found on BM III pottery has its model in basketry patterning.[30] This latter could well be an explanation for the painted lips of La Plata and Abajo, but could hardly account for the plain lips of Lino. Although perhaps an over-fine point, it is a fact[31] that when present at all, most of the BM II and III coiled basketry "rim-lines" are not the outside coils but the ones next to the outside. The lips of the baskets are thus left in

28 Of all the BM II and III coiled baskets examined by E. H. Morris and R. F. Burgh in preparation for their *Anasazi Basketry* (Publication, Carnegie Institution of Washington, no. 533, 1941), only one had any mineral coloring. Artificial colors of all the rest were in vegetal stain—which in pre-ceramic BM II was usually black.

29 S. J. Guernsey and A. V. Kidder, *Basket-Maker Caves of Northeastern Arizona* (Papers, Peabody Museum of American Archaeology and Ethnology, vol. 8, no. 2, 1921), p. 74.

30 E. H. Morris, *The Beginnings of Pottery Making in the San Juan Area* (Anthropological Papers, American Museum of Natural History, vol. 28, pt. 2, 1927), p. 197; Morris, *Archaeological Studies*, p. 221.

31 Noted by many examples in Morris and Burgh, *op. cit.*

natural light color. While admittedly unprovable, it is possible that this detail of the plain rim was included in the original faithful transfer of basketry designs to pottery, by means of vegetal paint. Further along this tenuous line of reasoning, the iron-painted types (La Plata and the probably later Abajo) might have copied not the original basketry patterns but the copies of these on Lino, and in this second-hand designing process have introduced (as the accompaniment of iron paint up from the south) the painted lip.

The first Basketmaker use of mineral paint, as noted above, may be rooted in rumors about early Mogollon painting technique that were carried north through the plain-ware belt to the Four Corners area, along trade-routes known to have existed. Such rumors might also have carried with them directions for painting vessel-lips in southern fashion—although that this detail was rumor-transmitted is less likely than its transfer on actual trade-specimens. No pre-600 AD southern red-on-brown sherds have yet been reported from the San Juan, however, nor do La Plata B/W designs resemble early Mogollon (or Hohokam) patterns except for the lip-stripe feature.

It is possible that a southern, specifically Mogollon, origin for the use of mineral paint on Basketmaker pottery may be indicated by the early distribution of both mineral and vegetal paints in the San Juan. As previously stated, vegetal-painted Lino extends eastward from southern Nevada across southern Utah and northern Arizona, dipping south of the Kayenta towards the Little Colorado. In its eastern border-belt, just west of the present Arizona-New Mexico line, it meets and to some extent mixes with mineral-painted La Plata. This belt terminates in the north at the Four Corners area—and here mineral paint seems to have a generally southern concentration as compared to a northern predominance of Lino. This condition is thus far suggested only by scanty data; plotting of many Lino and La Plata sites in the area would be necessary to either prove or disprove it. However, Shepard reports it as being true for the La Plata valley,[32] and Morris's Broken Flute Cave notes[33] perhaps lend affirmation. In the Animas valley farther east, the very sketchy data thus far issued may indicate the prevalence of mineral-painted, possibly late BM III or early P I pottery south of Durango and a vegetal or vegetal-plus-lead (producing a glaze) paint north of this point. The whole situation, conceivably, could reflect a northward thrust of the southern mineral paint technique up against an already existing Lino industry, striking it at the Four Corners not far from its eastern limit. As previously stated, western Lino

32 Morris, *Archaeological Studies*, p. 267.

33 E. H. Morris, *Archaeological Background of Dates in Early Arizona Chronology* (Tree-Ring Bulletin, vol. 2, no. 4, 1936), p. 36.

is still largely undated save through scanty cross-finds. The dates of eastern mineral paint sites (Chaco Canyon, Piedra) run later than the first "mixed" dates from the Four Corners.

This hypothesis of a Mogollon mineral-paint technique carried north from the San Simon and upper Gila to the Four Corners *after* the establishment of vegetal-painting throughout the San Juan could also account for the isolated and problematical eastern presence of Rosa B/W, noted above, which was chiefly vegetal-painted. It would make of Rosa a survival of an original vegetal-paint tradition, of early date in the Gobernador and "trapped" there in the spreading of the iron-paint technique up the San Juan and into the La Plata, Animas, and Piedra valleys.[34]

Mention has been made of the possible development of the northern group of black-on-reds and polychromes out of eighth century Abajo Red-on-Orange, and the fact that while these northern reds carried lip-striping (as had Abajo), a southern group centered in and below the Little Colorado failed to use the trait. It was also noted that while mineral-painted red types were produced in quantity along with vegetal-painted black-on-whites in the northwestern Pueblo area, little red-ware production ever accompanied the mineral-painted black-on-whites of the northeastern area.

While Abajo Red-on-Orange may be "not Mogollon,"[35] it cannot easily be cleared of the suspicion that before settling down in the southeastern corner of Utah it had somehow picked up some decidedly Mogollon-like characteristics. Actual Mogollon ceramic contact with the Four Corners area as early as *circa* 475 AD may be shown in Morris's Obelisk Cave findings.[36] If such contact was made and maintained (Brew postulates "a line of sites occupied at 700 A.D. practically within rifle-shot of each other, stretching from Mogollon Village and Forestdale in the south to Mancos Canyon and Alkali Ridge Site 13 in the north"),[37] continued production of red-ware by the Mogollon open-flame method could be expected all along the route. To the east, away from this north-south corridor along which both Mogollon and Anasazi influences travelled and passed each other, there was no continued stimulus for red-ware production and the

34 "A few surface indications lead us to assume that A.D. 700 is not the earliest date for these [Rosa] people, but the question must await further work" (Hall, *Early Stockaded Settlements*, p. 7).

35 Gladwin and Haury, as quoted by J. O. Brew, *Archaeology of Alkali Ridge, Southeastern Utah* (Papers, Peabody Museum of American Archaeology and Ethnology, vol. 21, 1946), p. 292.

36 Morris, *Archaeological Background*, pp. 34-36.

37 Brew, *op. cit.*, pp. 294-295.

black-on-whites alone were made. It was not until the fourteenth century that red-ware, by then a Glaze, penetrated this eastern district in a lateral thrust from the Little Colorado. Why this southern, Glaze-producing red-ware group did not carry lip-striping as well as the northern, possibly Abajo-derived series cannot readily be explained. In other aspects of design its types show not only Mogollon but much Chacoan influence.

In the historic field, the revived use of black lip-striping on the matte paint types which succeeded Glaze in the Acoma-Zuñi, lower Jemez valley, and middle Rio Grande areas is still a problematical matter owing to the scarcity of datable material. That most, if not all, of these earliest post-Spanish matte polychromes began with red-slipped lips (carried over from Glaze) seems certain. As noted above, the only known continuation of lip-striping through the Glaze period and into the matte polychrome was on the final subtypes of Chupadero B/W in the southeastern Pueblo sector. The possibility of their having had much effect on matte polychrome design, either directly or—as previously discussed—through a transfer of lip-striping to local late Glaze forms, seems remote. They vanished completely about 1675 AD, with the abandonment of the Manzano pueblos.

The black-lipped rim-sherds of both "Ashiwi" (or Zuñi) and "Puname" (or Zia) type found by Kidder at Pecos are definitely of pre-1838 and possibly of late eighteenth century origin.[38] The tuff temper of Mera's two "Aberrant Ogapoge" specimens could indicate a Rio Grande source for each, although one is reported to have come from Pecos and the other was found in a region of the Gobernador known to have been occupied by Pueblo refugees from *circa* 1696 to possibly 1750. Both are black-lipped. A vegetal-painted, tuff-tempered, black-lipped polychrome bowl bearing the thin Sankawi style of decoration was recently found in a Chaco Canyon refugee site by Mr Gordon Vivian, of the National Park Service. In these few instances is summed up practically all of the chronological data yet available on the post-Spanish revival of black lip-striping.[39]

Where the practise was first revived is also unknown. Its priority in the west may be indicated in a comparison of its usage on "Ashiwi," "Puname," and

38 Kidder and Shepard, *The Pottery of Pecos*, pp. 376 and 377.

39 Publication of detailed descriptions of the matte polychromes found by Morris in his Gobernador refugee-site excavations is awaited with interest. The shifting and often commingled residence of linguistically different groups in this and other secluded areas during the Revolt period—the extent of which is suggested by references in Spanish archives but the full details of which have not yet been compiled—undoubtedly led to the diffusion of ceramic and other traits in the early part of the eighteenth century. The mixture of traits may make it difficult to use "refugee pottery" as a certain guide to the identification of its makers—as is exemplified by Vivian's anomalous Chaco Canyon bowl noted above.

"Tewa," as noted above. Also, even the oldest of the recognizable modern Zuñi, Acoma, and Zia vessels are practically one hundred percent black-lipped, implying a well-grounded western usage of the trait, while many old recognizable Santa Ana and a few old Santo Domingo and Cochiti specimens (especially large storage-jars) in the Laboratory collections carry red-slipped lips.

The consistent use of black lip-striping by these last two groups for the past century or more is the only known instance in all of Pueblo ceramic history in which the trait is a feature of vegetal-painted pottery. Long previously, as stated above, both lip-striping and the use of vegetal paint had been practised, separately, in the eastern Keres area. If either of these traits pertained to Keresan ancestors of the Cochiti and Santo Domingo peoples, their sudden re-usage, together, after a lapse of three centuries for one and more than four centuries for the other, requires more explaining than the postulation of mere cultural tradition. A separate borrowing of each would better fit the case, with their abnormal combination being but one mark of the general disturbance of Pueblo thought-habits, as evidenced in ceramic design, which began with the Spanish conquest.

That vegetal painting was borrowed from the north seems probable, although the whole picture of the replacement of Glaze by matte polychromes in the middle Rio Grande is extremely vague. Some time before the Pueblo Revolt (1680) Glaze took over the tall-necked olla form derived from the northern Sankawi B/C, which form also became standard for most of the "Tewa" matte paint variants. Whether this occurred before "Tewa" itself became popular (and was made ?) in the eastern Keresan area is not known; vessels of both types, of the same shape, have been found in apparently the same levels of sites extending from Pecos across the Galisteo Basin and the Rio Grande to the Jemez valley.

Reasons for the peculiar characteristics of the late Glaze and for the eventual giving up of the Glaze-painting technique have often been conjectured. That the Spaniards cut off the familiar sources of lead ore and thereby forced the Indians to search out new outcroppings of slightly different and therefore unmanageable composition, may be true. Later the Indians themselves may have stopped using this "black market" Glaze in order to foil the Spaniards' ever-avid search for new ore deposits,[40] often worked with Indian labor. Again, the permanent dislocation

40 As well documented by J. B. Bailey (*Diego De Vargas and the Reconquest of New Mexico*, Albuquerque, 1940), a strong Spanish interest in quicksilver which stemmed from the Court itself (*idem*, p. 16) played a part in the Reconquest of 1692-93. De Vargas had served as administrator of the royal quicksilver supply before entering New Mexico (*idem*, p. 11), and while waiting at El Paso "his research [on quicksilver] was pressed into every conceivable source in the region" (*idem*, p. 17). He combined prospecting for the ore with his march to the Hopi pueblos in 1692 (*idem*, p. 85). Although no appreciable amount of quicksilver was

of many Glaze-making groups during the tumultuous Revolt years, and the temporary sojourns of others in refugee pueblos remote from known lead outcroppings could have hastened the decline in the east.

Quite another possibility might have been the complete unsuitability of the thick and "runny" late glaze paints for line-drawing, which was the basic and apparently unchangeable Indian idea of ceramic decoration. The Spaniards may have been responsible for the slight change in formula which resulted in the increased fluidity and glassiness of the post-1600 Glazes, in an effort to stimulate Pueblo production of an all-over Glaze similar to that of Mexican-made "olive-jars" and other utility vessels. If such an effort was made, it was unsuccessful; to the Indian, glaze paint was a drafting-medium rather than a slip. But it was practically impossible to draw any kind of design with the seventeenth century glaze paint and have it come through the firing process unspoiled by "running" of the glaze. To the Spaniards especially, who as self-appointed teachers and as customers were in a position to exert great influence upon Pueblo ceramics from the beginning of the Mission period, the unpredictable behavior of the Indian glaze in firing must have been painful. Undoubtedly, in their estimation, it was better to give it up altogether than to be unable to draw even a recognizable bird with it. Their opinion on the subject might have mattered little if the Indians themselves had not wanted, and tried desperately, to draw Glaze birds. What came of their efforts, on the latest Glazes, is sufficiently apparent on surviving sherds to make it seem likely today that it was stubbornness alone which kept the Rio Grande Keresans using glaze paint as long as they did, and that they were ready to drop it for the neat, controllable vegetal paint of their northern neighbors as soon as a good enough reason should present itself.

Such a reason may have been the above-mentioned stoppage of lead ore, through its either being denied to or purposefully forsworn by the Indians. If such a use-proscription did occur, it could explain the cessation of Glaze production not only in the Rio Grande but throughout the whole Pueblo area, in all parts of which the Spanish search for ores was constantly pressed. The western Keresans, however, as well as the Zuñi, turned (or reverted) to a matte mineral paint when they gave up Glaze; the fact that the Rio Grande groups did not do so may be laid not only to their familiarity with the "Tewa" vegetal-painted types during the last years of their own Glaze-production, but to their closer post-Revolt relationships with surrounding Tewa, Tano, and Jemez peoples—

ever found in New Mexico, the Spaniards were undoubtedly aware of its association with some lead and copper deposits in other areas and would therefore have investigated every clue to new finds of these latter in New Mexico.

all possessing either current or past traditions of vegetal-painting—than with their own western linguistic relatives.

It is also possible that their final abandonment of Glaze can be tied to the sudden efflorescence of pottery design which occurred at about the turn of the seventeenth century or slightly later. This phenomenon is clearly visible in the various types of decoration in the "Tewa" series, or group. One, probably the earliest and of northern origin, is a mere copy of the meagre Sankawi style, its most typical motif being a dotted, two-or-three-lined zigzag band encircling the vessel (a motif also common on Biscuit B and Jemez B/W). Curvilinear elements are rare, and the entire patterning is perfunctory, thin and cold. Another style, much richer in concept, makes use of curved lines, "feather" elements, and incipient vegetal forms, while still another adds a matte red paint to closed areas in the patterning—following a common scheme of the last Rio Grande Glaze. A fourth style is the one previously noted as appearing on Kidder's geometrically designed "Modern Painted" ollas from Pecos, which were more often round-bodied than of the tall-necked "Tewa" form.[41]

It is hard to see a developmental relationship between the first style and any of the other three. The first is wholly Pueblo; the others could very well result from an acceptance of Spanish power and art-forms by the Pueblos following the Reconquest. The geometric style in particular—so completely unlike Sankawi and with no common prototypes on either Glaze or prehistoric matte paint wares anywhere in the Southwest—seems to me to be wholly Spanish in principle. In a later paper I shall discuss the possibility of its origin in the tile-like designs painted on mission walls and altars—by Indians, under the direction of the priests—in imitation of the real tiling lavishly used in the churches of Mexico and Spain. Even today, such painted tile-patterns appear in New Mexican churches—including the last of the several successive churches at Santo Domingo, which settlement in the seventeenth century was the ecclesiastical capital of the province[42] and therefore the point at which Spanish art-forms would be most strongly impressed upon the Indians. Transferred to pottery, these tile-patterns—which like the other European designs depended upon sharpness of outline for their effect—obviously could not have been done in the glaze paint of the period. A more precise medium was necessary, and the Keresan potters, who quite evidently had not thought it worth while to give up Glaze in order to copy the

41 Kidder, *The Pottery of Pecos, Vol. 1*, p. 147.

42 George Kubler, *The Religious Architecture of New Mexico* (Colorado Springs, 1940), p. 108.

dull early "Tewa" copies of Sankawi, may at last have found a valid reason for the change in their interest in European design.

Concerning their adoption of the black lip-stripe, until closer dating of post-Spanish sites or levels throughout the entire Pueblo area is effected, only guesses can be made. The trait may be part of the increasing specialization of the various Pueblo pottery types which occurred (apparently) in the first half of the nineteenth century—a Keresan "hall-mark" deliberately employed by Cochiti and Santo Domingo (and possibly San Felipe) potters to help set their products apart from those of Tesuque and San Ildefonso. More probably, as mentioned above, its origin lies somewhere in the shuffling of traits resulting from the movements and inter-mixtures of Pueblo groups during and after the Revolt years. This period, in which cultural borders between the eastern and western Pueblos were many times crossed and recrossed,[43] needs much investigation—in the making of which a comparative analysis of sherds from "refugee sites" in the Gobernador, Chaco, de Chelly, and other districts would be a most important tool.

Laboratory of Anthropology
Santa Fe, New Mexico

43 Some of the movements and mixtures of peoples during this period are well recounted by Bailey (*op. cit.*) and Reiter (*op. cit.*), the latter with particular reference to eastern Keresan, Jemez, and Zuñi contacts.

SOME PUBLICATIONS

OF THE

UNIVERSITY OF NEW MEXICO AND THE LABORATORY OF ANTHROPOLOGY

¶ *For the following address orders to the University of New Mexico Press Albuquerque, New Mexico*

University of New Mexico Bulletin, Anthropological Series

FLORENCE M. HAWLEY Field Manual of Prehistoric Southwestern Pottery Types (Vol. 1, no. 4, 1936. 126 pp., map, table [revised 1950]) ..... $ 1.00

[DONALD D. BRAND, ED.] Symposium on Prehistoric Agriculture (Vol. 1, no. 5, 1936. 72 pp., 6 figs.) 1.00

MORRIS EDWARD OPLER The Character and Derivation of the Jicarilla Holiness Rite (Vol. 4, no. 3, 1943. 98 pp., plate) 1.00

University of New Mexico Publications in Anthropology

HARRY HOIJER Navaho Phonology (No. 1, 1945. 60 pp.) 1.00

LESLIE SPIER Comparative Vocabularies and Parallel Texts in Two Yuman Languages of Arizona (No. 2, 1946. 150 pp.) 2.00

KATHERINE SPENCER Reflection of Social Life in the Navaho Origin Myth (No. 3, 1947. 140 pp.) 2.00

NORMAN E. GABEL A Comparative Racial Study of the Papago (No. 4, 1949. 96 pp., 5 plates) 1.50

ROBERT H. LISTER Excavations at Cojumatlán, Michoacán, Mexico (No. 5, 1949. 106 pp., 36 figs., 4 plates) 1.50

JEAN B. JOHNSON The Opata: an Inland Tribe of Sonora (No. 6, 1950. 50 pp., 3 plates) 1.00

LELAND C. WYMAN The Sandpaintings of the Kayenta Navaho (No. 7, 1952. 120 pp., 49 figs.) 1.75

DAVID F. ABERLE The Kinship System of the Kalmuk Mongols (No. 8, 1953, 48 pp., 3 diagrams) 1.00

University of New Mexico Press Publications

EDWARD F. CASTETTER AND WILLIS H. BELL *Pima and Papago Indian Agriculture* (1942. 245 pp., 5 figs., map) 3.50

EMIL W. HAURY [AND COLLABORATORS] *The Stratigraphy and Archaeology of Ventana Cave, Arizona* (1950. xxvii + 599 pp., 66 plates, 118 figs., 66 tables. Published jointly with University of Arizona Press) 15.00

EDWARD F. CASTETTER AND WILLIS H. BELL *Yuman Indian Agriculture* (1951. 288 pp., 5 maps, 1 fig., 2 plates) 6.00

¶ *For the following address orders to the Laboratory of Anthropology Post Office Box 1727, Santa Fé, New Mexico*

Technical Series Bulletin

H. P. MERA A Proposed Revision of the Rio Grande Glaze Paint Sequence (No. 5, 1933. 11 pp., figs.) 1.00

H. P. MERA Population Changes in the Rio Grande Glaze-Paint Area (No. 9, 1940. 41 pp., 29 maps) 2.00

J. D. JENNINGS A Variation of Southwestern Pueblo Culture. GEORGE NEUMANN Analysis of the Skeletal Material (No. 10, 1940. 20 pp., 8 plates, 12 figs., 4 maps, 2 charts) 1.25